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# Standard Loose-Leaf Encyclopedia



This new work has been planned and prepared to obviate the chief obstacles in the way of a general use of encyclopediac collections, viz:—their bulk, and their excessive technicality; and, by elimination of these obstacles—further by a novel method of continuous insertion of current material—to produce an encyclopedia intelligible not only, but inviting, to the people at large.

Under the first head—that of size—the new work is so condensed as to occupy but four volumes; under the second head, the articles—always subject to revision—are written throughout in simple, direct, everyday English.

It is unnecessary to enlarge on these essential points of improvement; they at once commend themselves to the great audience to whom they are addressed. There is need simply for the assurance that the condensation of the substance and the simplification of the style has been intrusted to skilled hands, and no effort spared to present briefly, clearly and accurately such information as a really practical up-to-date encyclopedia demands.

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# MODERN LOOSE LEAF ENCYCLOPEDIA

## VOL. I

### A

**A**, the first letter in almost all alphabets. Most modern languages, as French, Italian, German, have only one sound for a, namely, the sound which is heard in father pronounced short or long; in English this letter is made to represent seven sounds, as in the words father, mat, mate, mare, many, ball, what, besides being used in such digraphs as ea in heat, oa in boat.—A, in music, is the sixth note in the diatonic scale of C, and stands when in perfect tune to the latter note in the ratio of  $\frac{5}{4}$  to 1. The second string of the violin is tuned to this note.

**A** x, a symbol attached to vessels of the highest class, A referring to the hull of the vessel, while 1 intimates the sufficiency of the rigging and whole equipment.

**AA** (ä), the name of a great many streams of central and northern Europe.

**AACHEN** (ä'hèn). See Aix-la-Chapelle.

**AALBORG** (öl'borh), a seaport of Denmark, on the Liimfiord, see of a bishop, with a considerable trade, ship-building, fishing, etc. Pop. 31,457.

**AAR** (är), the name of several European rivers, of which the chief (160 miles long) is a tributary of the Rhine, next to it and the Rhone the longest river in Switzerland. It has its origin from the upper and lower glaciers of the Aar in the Bernese Alps. On it are Interlaken, Thun, Bern, Solothurn, and Aarau, to which, as to the canton of Aargau, it gives its name.



Aard-vark.

**AARD-VARK** (ärd'vark), a burrowing insectivorous animal of South Africa, having affinities with the ant-eaters and armadillos. Called also ground-hog and Cape pig.

**AARDWOLF** (ärd'wulf), a carnivorous burrowing animal of South Africa, allied to the hyenas and civets. Feeds on carrion, small mammals, insects, etc.

**AARGAU** (är'gou), or **ARGOVIE** (ar-go-vē), a northern canton of Switzerland; area, 543 square miles; hilly, well wooded, abundantly watered by the Aar and its tributaries, and well cultivated. It formed part of the canton Bern till 1798. Pop. 206,498, of whom more than half are Protestants. German is almost universally spoken. Capital, Aarau.

**AARON** (ä'ron), of the tribe of Levi, eldest son of Amram and Jochebed, and brother and assistant of Moses. At Sinai, when the people became impatient

at the long-continued absence of Moses, he complied with their request in making a golden calf, and thus became involved with them in the guilt of gross idolatry. The office of high-priest, which he first filled, was made hereditary in his family. He died at Mount Hor at the age of 123, and was succeeded by his son Eleazar.

**AARON'S ROD**. See Goldenrod and Mullein.

**AB**, the eleventh month of the Jewish civil, the fifth of the ecclesiastical, year—part of July and part of August.

**AB'ACA**, or Manila Hemp, a strong fiber yielded by the leaf-stalks of a kind of plantain which grows in the Indian Archipelago, and is cultivated in the Philippines. The outer fibers of the leaf-stalks are made into strong and durable ropes, the inner into various fine fabrics.

**AB'ACO**, Great and Little, two islands of the Bahamas group.

**AB'ACUS**, a Latin term applied to an apparatus used in elementary schools for facilitating arithmetical operations, consisting of a number of parallel cords or wires, upon which balls or beads are



Abacus.



Doric capital—*a*, the abacus.

strung, the uppermost wire being appropriated to units, the next to tens, etc.—In classic architecture it denotes the tablet forming the upper member of a column, and supporting the entablature. In Gothic architecture the upper member of a column from which the arch springs.

**ABAD'DON**, the name given in Rev. ix. 11 as that of the angel of the bottomless pit, otherwise called Apollyon.

**ABALONE** (ab-a-lō'ne), a name in California for a species of ear-shell that furnishes mother-of-pearl.

**ABAN'DONMENT**, a term in criminal law. Abandonment is the intentional exposure or desertion of a dependent person by one who is under a legal duty of protecting and maintaining him. A parent or a guardian of the person of a young child is guilty of a misdemeanor at common law if the child is physically injured in consequence of the abandonment; while if death results therefrom the abandoning parent or guardian is guilty of murder.

**ABA'RIM**, mountain range of eastern Palestine, including Nebo, on which Moses died.

**ABATEMENT**, in law, has various significations. Abatement of nuisances is the remedy allowed to a person injured by a public or private nuisance, of destroying or removing it himself. A plea in abatement is brought forward by a defendant when he wishes to defeat or quash a particular action on some formal or technical ground. Abatement, in mercantile law, is an allowance, deduction, or discount made for prompt payment or other reason.

**AB'ATIS**, **ABATTIS**, in military affairs, a mass of trees cut down and laid with their branches turned toward the enemy in such a way as to form a defense for troops stationed behind them.

**ABATTOIR** (ab-at-war'), a French term for a slaughter-house, now anglicized since the establishment of the celebrated abattoirs of Paris, instituted by Napoleon in 1807, and brought to completion in 1818. Such public slaughter-houses, provided with every sort of convenience, kept admirably clean, and with a plentiful supply of water, are now to be found in many large towns.

**ABBA**, a Semitic word equivalent to "Father," which, being applied in the Eastern Church to monks, superiors of monks, and other ecclesiastics, gave rise to the word abbot. In the Syriac and Coptic Churches it is given to the bishops.

**ABBAS I.**, the Great, shah or king of Persia, born in 1557, obtained the throne in 1586, and at his death in 1628 his dominions stretched from the Tigris to the Indus. He is looked upon by the Persians as their greatest sovereign.

**ABBASSIDES** (ab'as-sidz), the name of an Arabian dynasty which supplanted the Ommiades. It traced its descent from Abbas (born 566, died 652), uncle of Mohammed, and furnished thirty-seven caliphs to Bagdad between 749 and 1258. Harun al Rashid was a member of this dynasty. See Caliphs.

**ABBE** (äb-ä), the French word for abbot, was, before the French revolution, the common title of all who had studied theology either with a view to becoming ordained clergymen, or merely in the hope of obtaining some appointment or benefice, to which such study was considered a preliminary requisite.

**AB'BE**, Cleveland, American astronomer and meteorologist, born in New York City 1838. He graduated in 1857 at the Free Academy (now the College of the City of New York), and studied astronomy at Ann Arbor and at Cambridge. From 1868 to 1873 he was director of the Cincinnati Observatory, where he inaugurated a system of daily weather forecasts based upon simultaneous meteorological observations reported by telegraph. In December, 1870, Professor Abbe was called to Washington to prepare the official weather predictions and storm warnings, and was appointed professor of meteorology in the Weather Bureau. To him is due the initiation in May, 1879, of the movement toward the



introduction of the present system of standard time and hourly meridians. In January, 1873, he prepared the first official Monthly Weather Review, which has continued under his editorship. He is professor of meteorology in Columbian University, Washington, lecturer on meteorology in Johns Hopkins University, Baltimore, and a member of the National Academy of Sciences.

**ABBEOKUTA**, a town of West Africa, in the Lagos Protectorate, on the Ogun river 45 miles n. of Lagos, composed of scattered lines of mud houses, surrounded by a mud wall. It is connected with Lagos by a railway. Pop. 100,000 to 150,000.

**AB'BEY**, a monastery or religious community of the highest class, governed by an abbot, assisted generally by a prior, sub-prior, and other subordinate functionaries; or, in the case of a female

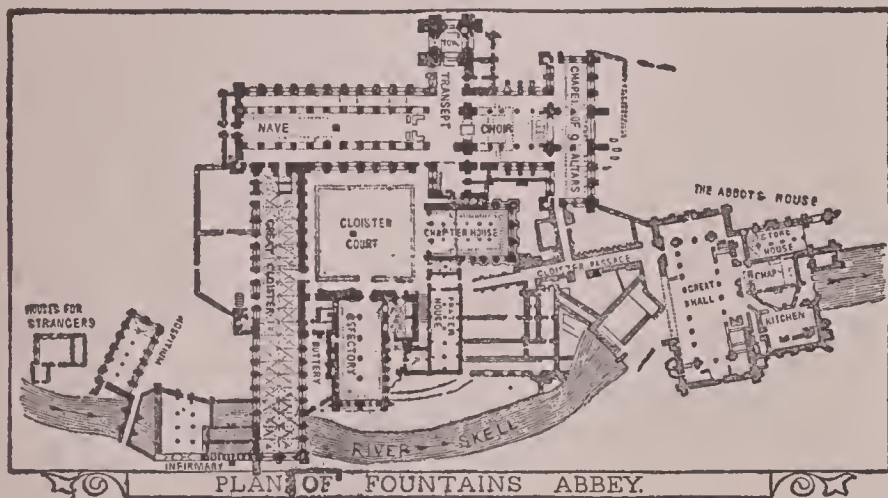
subject is the "Search for the Holy Grail." He was commissioned to paint the scene of the coronation of King Edward VII.

**AB'BOT**, the head of an abbey (see Abbey), the lady of similar rank being called abbess. An abbess, however, was not, like the abbot, allowed to exercise the spiritual functions of the priesthood, such as preaching, confessing, etc.; nor did abbesses ever succeed in freeing themselves from the control of their diocesan bishop. In the early age of monastic institutions (say. 300-600 A.D.) the monks were not priests, but simply laymen who retired from the world to live in common, and the abbot was also a layman. In the course of time the abbots were usually ordained, and when an abbey was directly attached to a cathedral the bishop was also abbot. At first the abbeyes were

Amherst. In 1839 he moved to Farmington. He died October 31, 1879. Abbott published more than two hundred volumes, the most noteworthy of which are The Rollo Books (28 volumes), The Franconia Stories (10 volumes), The Rainbow and Lucky Series (5 volumes), a number of juvenile histories, written in collaboration with his brother, and a series of histories of America.

**ABBOTT**, John Stephens Cabot, an American historian, a brother of Jacob Abbott, was born at Brunswick, Me., 1805, and graduated at Bowdoin College in 1825. He died at Fairhaven, Conn., June 17, 1887. His most noteworthy books are The French Revolution, The History of Napoleon Bonaparte, Napoleon at St. Helena, The History of Napoleon the Third, The History of the Civil War in America, and the History of Frederick II., Called Frederick the Great.

**ABBOTT**, Lyman, D.D. An American Congregational clergyman and editor, born at Roxbury, Mass., in 1835, son of Jacob Abbott. He graduated at the New York University in 1853. From 1869 he was successively one of the editors of Harper's Magazine, and the principal editor of the illustrated Christian Weekly. He succeeded Henry Ward Beecher as pastor of Plymouth Church, Brooklyn, in 1888, but resigned in May, 1899, and has since devoted himself entirely to literary work.



community, superintended by an abbess. An abbey invariably included a church. A priory differed from an abbey only in being scarcely so extensive an establishment, and was governed by a prior. Some priories sprang originally from the more important abbeys, and remained under the jurisdiction of the abbots; but subsequently any real distinction between abbeys and priories was lost. The greater abbeys formed most complete and extensive establishments, including not only the church and other buildings devoted to the monastic life and its daily requirements, such as the refectory or eating-room, the dormitories or sleeping-rooms, the room for social intercourse, the school for novices, the scribes' cells, library, and so on; but also workshops, storehouses, mills, cattle and poultry sheds, dwellings for artisans, laborers, and other servants, infirmary, guest-house, etc.

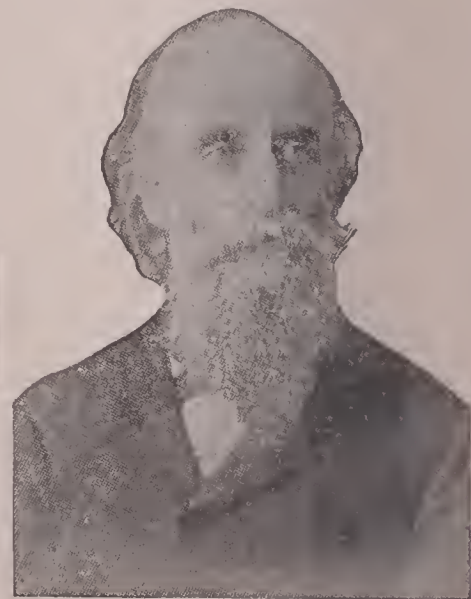
**ABBEY**, Edwin Austin, American figure painter. He was born in Philadelphia, April 1, 1852. He studied at the Pennsylvania Academy of the Fine Arts, and afterward worked in New York until 1883, when he removed to England. In painting he has produced important canvases, dealing with subjects taken from Shakespeare and from romantic story. One of his most important works decorates the delivery room of the Boston Public Library. Its

more remarkable for their numbers than for their magnitude, but latterly many of them were large and richly endowed, and the heads of such establishments became personages of no small influence and power, more especially after the abbots succeeded (by the eleventh century) in freeing themselves from the jurisdiction of the bishop of their diocese.

**AB'BOTSFORD**, the country-seat of Sir Walter Scott, on the south bank of the Tweed, in Roxburghshire, 3 miles from Melrose, in the midst of picturesque scenery, forming an extensive and irregular pile in the Scottish baronial style of architecture.

**ABBOTT**, Emma (Emma Abbott Wetherell), an American soprano, born 1849 in Chicago, Ill. She studied in Milan under San Giovanni and in Paris under Wartel and Albert James. She made her debut at Covent Garden, London. For three years thereafter she made an operatic and concert tour of England and Ireland under the direction of Colonel Mapleson. Subsequently she returned to the United States, where she sang with the Abbott and Hess Opera Company, and later with the English opera company long known by her name. She died in 1891.

**ABBOTT**, Jacob, a popular juvenile writer, born at Hallowell, Me., 1803. From 1825 to 1829 he was professor of mathematics and natural philosophy at



Lyman Abbott.

**ABBREVIATIONS**, devices used in writing and printing to save time and space: consisting usually of curtailments effected in words and syllables by the removal of some letters, often of the whole of the letters except the first. The following is a list of the more important:—

**A.B.**, *artium baccalaureus*, bachelor of arts; able seaman.

**Abp.**, archbishop.

**A.C.**, *ante Christum*, before Christ.

**Ac.**, acre.

**Acc.**,  $\frac{q}{c}$ , or acct., account.



## ABBREVIATIONS

**A.D.**, *anno Domini*, in the year of our Lord: used also as if equivalent to "after Christ," or "of the Christian era."  
**A.D.C.**, aide-de-camp.  
**Æt.** or **Ætat.**, *ætatis (anno)*, in the year of his age.  
**A.H.**, *anno Hegiræ*, in the year of the Hegira.  
**A.M.**, *ante meridiem*, forenoon; *anno mundi*, in the year of the world; *artium magister*, master of arts.  
**Anon.**, anonymous.  
**A.R.A.**, associate of Royal Academy (London).  
**A.R.S.A.**, associate of the Royal Scottish Academy.  
**A.U.C.**, *ab urbe condita*, from the building of Rome (753 B.C.).  
**A.V.**, authorized version.  
**B.A.**, bachelor of arts.  
**Bart.** or **Bt.**, baronet.  
**B.C.**, before Christ.  
**B.C.L.**, bachelor of civil law.  
**B.D.**, bachelor of divinity.  
**B.L.**, bachelor of law.  
**B.M.**, bachelor of medicine.  
**Bp.**, bishop.  
**B.S.**, bachelor of surgery.  
**B.Sc.**, bachelor of science.  
**B.V.**, blessed Virgin.  
**C.**, cap., or chap., chapter.  
**C.A.**, chartered accountant.  
**Cantab.**, *Cantabrigiensis*, of Cambridge  
**Cantuar.**, *Cantuariensis*, of Canterbury.  
**C.B.**, companion of the Bath.  
**C.D.V.**, carte de visite.  
**C.E.**, civil engineer.  
**Cf.**, *confer*, compare.  
**C.I.**, order of the Crown of India.  
**C.I.E.**, companion of the Indian Empire.  
**C.J.**, chief justice.  
**C.M.**, *chirurgiæ magister*, master in surgery; common meter.  
**C.M.G.**, companion of the order of St. Michael and St. George.  
**Co.**, company or county.  
**C.O.D.**, cash on delivery.  
**Cr.**, creditor.  
**Crim. con.**, criminal conversation.  
**C.S.**, civil service, clerk to the signet.  
**C.S.I.**, companion of the Star of India.  
**Ct.**, Connecticut.  
**Curt.**, current, the present month.  
**Cwt.**, hundredweight.  
**d.**, *denarius*, penny or pence.  
**D.C.**, District of Columbia.  
**D.C.L.**, doctor of civil law.  
**D.D.**, doctor of divinity.  
**Del.**, *delineavit*, drew it.  
**D.F.**, defender of the faith.  
**D.G.**, *Dei gratia*, by the grace of God.  
**D.L.**, deputy lieutenant.  
**D. Litt.**, *doctor litterarum*, doctor of letters.  
**Do.**, *ditto*, the same.  
**D.O.M.**, *Deo Optimo Maximo*, to God, the best and greatest.  
**Dr.**, doctor, also debtor.  
**D.Sc.**, doctor of science.  
**D.V.**, *Deo volente*, God willing.  
**Dwt.**, pennyweight.  
**E.**, east.  
**Ebor.**, *Eboracensis*, of York.  
**E.C.**, established church.  
**E.E.**, errors excepted.  
**e.g.**, *exempli gratia*, for example.  
**E.I.**, East Indies.  
**Etc.** or **&c.**, *et cetera*, and the rest.  
**Exr.**, executor.

**F.** or **Fahr.**, Fahrenheit's thermometer.  
**F.A.S.**, fellow of the Antiquarian Society.  
**F.C.**, Free Church.  
**F.D.**, *fidei defensor*, defender of the faith.  
**Fec.**, *fecit*, he made or did it.  
**F.G.S.**, fellow of the Geological Society.  
**F.H.S.**, fellow of the Horticultural Society.  
**Fl.**, flourished.  
**Fla.**, Florida.  
**F.L.S.**, fellow of the Linnæan Society.  
**F.M.**, field-marshal.  
**F.O.B.**, free on board (goods delivered).  
**F.R.A.S.**, fellow of the Royal Astronomical (or Asiatic) Society.  
**F.R.C.P.**, fellow of the Royal College of Physicians.  
**F.R.C.S.**, fellow of the Royal College of Surgeons.  
**F.R.G.S.**, fellow of the Royal Geographical Society.  
**F.R.S.**, fellow of the Royal Society.  
**F.R.S.E.**, fellow of the Royal Society of Edinburgh.  
**F.S.A.**, fellow of the Society of Arts or Antiquaries.  
**F.S.S.**, fellow of the Statistical Society.  
**Ft.**, foot or feet.  
**F.Z.S.**, fellow of the Zoological Society.  
**Ga.**, Georgia.  
**Gal.**, gallon.  
**G.C.B.**, grand cross of the Bath.  
**G.C.M.G.**, grand cross of St. Michael and St. George.  
**G.C.S.I.**, grand commander of the Star of India.  
**G.P.O.**, general post-office.  
**H.B.M.**, his or her Britannic majesty.  
**H.E.I.C.S.**, honorable East India Company's service.  
**Hhd.**, hogshead.  
**H.I.H.**, his or her imperial highness.  
**H.M.S.**, his or her majesty's ship.  
**Hon.**, honorable.  
**H.R.**, house of representatives.  
**H.R.H.**, his (her) royal highness.  
**H.S.H.**, his (her) serene highness.  
**Ia.**, Iowa.  
**Ib.** or **Ibid.**, *ibidem*, in the same place.  
**Id.**, *idem*, the same.  
**i.e.**, *id est*, that is.  
**I.H.S.**, *Iesus hominum salvator*, Jesus the Savior of men: originally it was **ΙΗΣ**, the first three letters of **ΙΗΣΟΥΣ** (*Iesus*), *Jesus*.  
**Incog.**, *incognito*, unknown.  
**Inf.**, *infra*, below.  
**I.N.R.I.**, *Iesus Nazarenus Rex Iudæorum*, Jesus of Nazareth, King of the Jews.  
**Inst.**, instant, or of this month; institute.  
**I.O.U.**, I owe you.  
**J.P.**, justice of the peace.  
**Jr.**, junior.  
**J.U.D.**, *juris utriusque doctor*, doctor both of the civil and the canon law.  
**K.C.**, king's counsel.  
**K.C.B.**, knight commander of the Bath.  
**K.C.M.G.**, knight commander of St. Michael and St. George.

## ABBREVIATIONS

**K.C.S.I.**, knight commander of the Star of India.  
**K.G.**, knight of the Garter.  
**K.G.C.B.**, knight grand cross of the Bath.  
**K.P.**, knight of St. Patrick.  
**K.T.**, knight of the Thistle.  
**Kt.** or **Knt.**, knight.  
**Ky.**, Kentucky.  
**L.**, l., or £, pounds sterling.  
**L.A.**, literate in arts.  
**La.**, Louisiana.  
**Lat.**, latitude.  
**Lb.** or **lb.**, *libra*, a pound (weight).  
**L.C.J.**, lord chief-justice.  
**Ldp.**, lordship.  
**L.D.S.**, licentiate in dental surgery.  
**Lit. D.**, doctor of literature.  
**L.L.**, Low Latin.  
**L.L.A.**, lady literate in arts.  
**LL.B.**, *legum baccalaureus*, bachelor of laws.  
**LL.D.**, *legum doctor*, doctor of laws (that is, the civil and the canon law).  
**LL.M.**, master of laws.  
**Lon.** or **Long.**, longitude.  
**L.R.C.P.**, licentiate Royal College of Physicians.  
**L.R.C.S.**, licentiate of the Royal College of Surgeons.  
**L.S.A.**, licentiate of the Society of Apothecaries.  
**L.S.D.**, *libra, solidi, denarii*, pounds, shillings, pence.  
**M.A.**, master of arts.  
**Mass.**, Massachusetts.  
**M.B.**, *medicinæ baccalaureus*, bachelor of medicine.  
**M.C.**, member of Congress; master in surgery.  
**M.D.**, *medicinæ doctor*, doctor of medicine.  
**Md.**, Maryland.  
**Me.**, Maine.  
**M.E.**, mining engineer; Methodist Episcopal.  
**Messrs.**, messieurs, gentlemen.  
**M.F.H.**, master of fox-hounds.  
**M.I.C.E.**, member of the Institution of Civil Engineers.  
**Mlle.**, mademoiselle.  
**Mme.**, madame.  
**Mo.**, Missouri.  
**M.P.**, member of Parliament.  
**M.R.C.S.**, member of the Royal College of Surgeons.  
**M.R.C.V.S.**, member of the Royal College of Veterinary Surgeons.  
**M.R.I.A.**, member of the Royal Irish Academy.  
**MS.**, manuscript; **MSS.**, manuscripts.  
**Mus. D.**, *musicæ doctor*, doctor of music.  
**N.**, north.  
**N.B.**, *nota bene*, take notice; also North Britain, New Brunswick.  
**N.C.**, North Carolina.  
**N.D.**, no date.  
**Nem. con.**, *nemine contradicente*, one contradicting, unanimously.  
**N.H.**, New Hampshire.  
**N.J.**, New Jersey.  
**No.**, *numero*, number.  
**N.P.**, notary public.  
**N.S.**, new style, Nova Scotia.  
**N.S.W.**, New South Wales.  
**N.T.**, New Testament.  
**N.Y.**, New York.  
**N.Z.**, New Zealand.  
**O.**, Ohio.  
**Ob.**, *obiit*, died.



O S., old style.  
 O.T., Old Testament.  
 Oxon., *Oxonensis*, of Oxford.  
 Oz., ounce or ounces.  
 Pa., Pennsylvania.  
 P.C., privy-councilor.  
 P.E., Protestant Episcopal.  
 Per cent., *per centum*, by the hundred.  
 Ph.D., *philosophia doctor*, doctor of philosophy.  
 Plux., *pinxit*, painted it.  
 P.M., *post meridiem*, afternoon.  
 P.O., post-office.  
 P.O.O., post-office order.  
 P.P., parish priest.  
 Pp., pages.  
 P.P.C., *pour prendre congé*, to take leave.  
 Prox., *proximo* (*mense*), next month.  
 P.S., postscript.  
 Q., question; queen.  
 Q.C., queen's counsel.  
 Q.E.D., *quod erat demonstrandum*, which was to be demonstrated.  
 Q.E.F., *quod erat faciendum*, which was to be done.  
 Qu., query.  
 Quant. suff., *quantum sufficit*, as much as is needful.  
 Q.V., *quod vide*, which see.  
 R., *rex*, king, queen.  
 R.A., royal academician; royal artillery.  
 R.A.M., Royal Academy of Music.  
 R.C., Roman Catholic.  
 R.E., royal engineers.  
 Rev., reverend.  
 R.H.A., Royal Hibernian Academician.  
 R.I., Rhode Island.  
 R.I.P., *requiescat in pace*, may he rest in peace.  
 R.M., royal marines.  
 R.N., royal navy.  
 R.S.A., royal Scottish academician.  
 R.S.V.P., *répondez, s'il vous plaît*, reply, if you please.  
 Rt. Hon., right honorable.  
 Rt. Wpful., right worshipful.  
 R.V., revised version.  
 S., South.  
 S. or St., saint.  
 S.C., South Carolina.  
 Sc., *scilicet*, namely, viz.  
 S.J., Society of Jesus (Jesuits).  
 S.P.C.K., Society for Promoting Christian Knowledge.  
 S.P.Q.R., *senatus populusque Romanus*, the senate and people of Rome.  
 S.S.C., solicitor before the supreme courts.  
 St., saint, street.  
 S.T.D., *sacrae theologiae doctor*, doctor of divinity.  
 S.T.P., *sacrae theologiae professor*, professor of divinity.  
 T.C.D., Trinity College, Dublin.  
 Ult., *ultimo*, last.  
 U.P., United Presbyterian.  
 U.S., United States.  
 U.S.A., United States of America.  
 U.S.N., United States navy.  
 V., *vide*, see; also *versus*, against.  
 Va., Virginia.  
 V.C., Victoria Cross.  
 Viz., *enilicet*, to wit, or namely.  
 V.P., vice-president.  
 V.S., veterinary surgeon.  
 Vt., Vermont.  
 W., west.  
 W.I., West Indies.

W.S., writer to the signet.

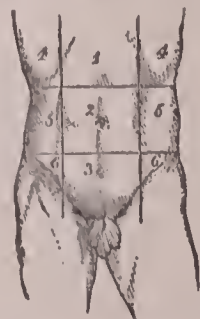
Xmas, Christmas.

In LL.D., LL.B., etc., the letter is doubled, according to the Roman system, to show that the abbreviation represents a plural noun.

ABDE'RA, an ancient Greek city on the Thracian coast, the birthplace of Democritus (the laughing philosopher), Anaxarchus, and Protagoras. Its inhabitants were proverbial for stupidity.

ABDICA'TION, properly the voluntary, but sometimes also the involuntary resignation of an office or dignity, and more especially that of sovereign power.

ABDO'MEN, in man, the belly, or lower cavity of the trunk, separated from the upper cavity or thorax by the diaphragm or midriff, and bounded below by the bones of the pelvis. It contains



Abdominal regions.

the viscera belonging to the digestive and urinary systems. What are called the abdominal regions will be understood from the accompanying cut, in which 1 is the epigastric region, 2 the umbilical, 3 the pubic, 4 4 the right and left hypochondriac, 5 5 the right and left lumbar, 6 6 right and left iliac. The name is given to the corresponding portion of the body in other animals. In insects it comprises the whole body behind the thorax, usually consisting of a series of rings.

ABDOM'INAL FISHES, a group of the soft-finned fishes, having fins upon the abdomen, and comprising the herring, pike, salmon, carp, etc.

ABDUC'TION, a legal term, generally applied to denote the offense of carrying off a female, either forcibly or by fraudulent representations. Such a delinquency with regard to a man is styled kidnapping. There are various descriptions of abduction recognized in criminal jurisprudence, such as that of a child, of an heiress, or of a wife.

AB'DUL-HAM'ID, Sultan of Turkey, born in 1812, succeeded his brother Murad V., who was deposed on proof of his insanity in 1876.

ABECEDA'RIAN, a term formed from the first four letters of the alphabet, and applied to the followers of Storch, a German Anabaptist, in the sixteenth century, because they rejected all worldly knowledge, even the learning of the alphabet.

A BECK'ETT, Gilbert Abbot, English writer, born near London, in 1811. He wrote Comic History of England, Comic History of Rome, and Comic Blackstone, and between fifty and sixty plays, some of which still keep the stage. He died in 1856.

A BECKETT, Thomas. See Beckett.

ABEL, properly Hebel, the second son of Adam. He was a shepherd, and was slain by his brother Cain from jealousy because his sacrifice was accepted, while Cain's was rejected. Several of the fathers, among others SS. Chrysostom and Augustin, regard him as a type of Christ.

ABELARD (ab'e-lärd), or ABAILARD, Peter, a celebrated scholastic teacher, born near Nantes in Brittany, in 1079. He made extraordinary progress with his studies, and, ultimately eclipsing his teachers, he opened a school of scholastic philosophy near Paris, which attracted crowds of students from the neighboring city. His success in the fiery debates which were then the fashion in the schools made him many enemies, among whom was Guillaume de Champeaux, his former teacher, chief of the cathedral school of Notre-Dame, and the most advanced of the Realists. Abelard succeeded his adversary in this school (in 1113), and under him were trained many men who afterward rose to eminence, among them being the future Pope Celestin II., Peter Lombard, and Arnold of Brescia. While he was at the height of his popularity, and in his fortieth year, he became infatuated with a passion for Heloise—then only eighteen years of age—niece of Fulbert, a canon of Paris. Obtaining a home in Fulbert's house under the pretext of teaching Heloise philosophy, their intercourse at length became apparent, and Abelard, who had retired to Brittany, was followed by Heloise, who there gave birth to a son. A private marriage took place, and Heloise returned to her uncle's house, but, refusing to make public her marriage (as likely to spoil Abelard's career), she was subjected to severe treatment at the hands of her uncle. To save her from this Abelard carried her off and placed her in a convent at Argenteuil, a proceeding which so incensed Fulbert that he hired ruffians, who broke into Abelard's chamber and subjected him to a shameful mutilation. Abelard, filled with grief and shame, became a monk in the abbey of St. Denis, and Heloise took the veil. Abelard did not long survive, dying at St. Marcel, near Chälön-sur-Säone, 1142. Heloise, who had become abbess of the Paraclete, had him buried there, where she herself was afterward laid by his side.

ABELE (a-bäl'), a name of the white poplar.

A'BELITE, ABE'LIAN, a member of a religious sect in Africa which arose in the fourth century after Christ. They married, but lived in continence, after the manner, as they maintained, of Abel, and attempted to keep up the sect by adopting the children of others.

ABELMOS'CHUS (-mos'kus), a genus of tropical plants of the mallow family. One species yields edible pods and also a valuable fiber. The fruit, called okra or oehra, is used in soups.

AB'ERCROMBIE, John, M.D., a Scottish writer on medical and moral science, and an eminent physician, born in Aberdeen, 1781, died at Edinburgh in 1844. He graduated at the university of Edinburgh in 1803, and subsequently



pursued his studies in London, returning to Edinburgh in 1804, where he acquired an extensive practice as a physician. He is known from his *Inquiries concerning the Intellectual Powers and his Philosophy of the Moral Feelings*.

**ABERDEEN'**, a university city, and royal, municipal, and parliamentary burgh of Scotland, cap. of the county of same name, mainly on the north bank of the Dee at its entrance into the German Ocean, and between this river and the Don, with a part also on the south bank of the Dee, while the municipal limits include the adjacent Woodside. There are docks 34 acres in area, an extensive tidal harbor and basin, and a graving-dock. The shipping trade is extensive. The industries embrace wool, cotton, jute, linen, combs, soap, preserved provisions, chemicals, paper, shipbuilding, and especially the cutting and polishing of granite. The fishing industry is of great importance. Pop. (1901), 153,100.—The County of Aberdeen forms the northeastern portion of Scotland, and is bounded on the east and north by the North Sea. Area, 1,251,451 acres. It is divided into six districts (Mar, Formartine, Buchan, Alford, Garioch, and Strathbogie), and is generally hilly, there being in the southwest some of the highest mountains in Scotland, as Ben Macdhui (4295 feet), Cairntoul (4245), Cairngorm (4090), Lochnagar, etc. Pop. 304,420.

**ABERRA'TION**, in astronomy, the difference between the true and the observed position of a heavenly body, the result of the combined effect of the motion of light and the motion of the eye of the observer caused by the annual or diurnal motion of the earth; or of the motion of light and that of the body from which the light proceeds. When the auxiliary cause is the annual revolution of the earth round the sun it is called *annual aberration*, in consequence of which a fixed star may appear as much as 20".4 from its true position; when the auxiliary cause is the diurnal rotation of the earth on its axis it is called *diurnal aberration*, which amounts at the greatest to 0".3; and when the auxiliary cause is the motion of the body from which the light proceeds it is called *planetary aberration*.

**A'BIB**, the first month of the Jewish ecclesiastical year, and the seventh of the civil year, corresponding to the latter part of March and the first of April. Also called Nisan.

**ABIOGENESIS** (a-bi-o-jen'e-us), the doctrine or hypothesis that living matter may be produced from non-living; spontaneous generation.

**ABJURA'TION**, Oath of, an oath which by an English act passed in 1701 had to be taken by all holders of public offices, clergymen, teachers, members of the universities, and lawyers, adjuring and renouncing the exiled Stuarts: superseded in 1858 by a more comprehensive oath, declaring allegiance to the present royal family.—*Abjuration* of the realm was an oath that a person guilty of felony, and who had taken sanctuary, might take to go into exile, and not return on pain of death.

**AB'LATIVE**, a term applied to a case of nouns, adjectives, and pronouns in

Latin, Sanskrit, and some other languages; originally given to the case in Latin because separation from (ab, from, latus, taken) was considered to be one of the chief ideas expressed by the case.

**ABOLI'TIONISTS**, the name by which those opponents of slavery were designated who were the most intense in their desire to secure the immediate emancipation of the blacks. Although discredited in many quarters, the abolitionists were in the end successful, from one point of view, in making slavery a national issue and in hastening the time of final decision as to its continuance.

**ABOMA'SUM, ABOMA'SUS**, the fourth stomach of ruminating animals, next the omasum or third stomach.

**ABORIG'INES** (ab-o-rij'i-nēz), the name given in general to the earliest known inhabitants of a country, those who are supposed to have inhabited the land from the beginning [The singular of the word is *Aboriginal*, or sometimes *Aborigine*.]

**ABOR'TION**, in medicine, the expulsion of the fœtus before it is capable of independent existence. This may take place at any period of pregnancy before the completion of the twenty-eighth week. A child born after that time is said to be premature. Abortion may be the result of the general debility or ill health of the mother, of a plethoric constitution, of special affections of the uterus, of severe exertions, sudden shocks, etc. Various medicinal substances, generally violent emmenagogues or drastic medicines, are believed to have the effect of provoking abortion, and are sometimes resorted to for this purpose. Attempts to procure abortion are punishable by law in all civilized states. The term is applied in botany to denote the suppression by non-development of one or more of the parts of a flower, which consists normally of four whorls—namely, calyx, corolla, stamens, and pistil.

**ABOUKIR** (a-bō-kēr'), a small village on the Egyptian coast, 10 miles east of Alexandria. In Aboukir Bay took place the naval battle in which Nelson annihilated a French fleet on the night of 1st and 2d August, 1798, thus totally destroying the naval power of France in the Mediterranean.

**ABOUT** (a-bō), Edmond François Valentin, a French novelist and miscellaneous writer, born in 1828, died in 1885.

**ABRACADAB'RA**, a word of eastern origin used in incantations. When written on paper so as to form a triangle, the first line containing the word in full, the one below it omitting the last letter, and so on each time until only one letter remained, and worn as an amulet it was supposed to be an antidote against certain diseases.

A B R A C A D A B R A  
A B R A C A D A B R  
A B R A C A D A B  
A B R A C A D A  
A B R A C A D  
A B R A C A  
A B R A C  
A B R A  
A B R  
A B  
A

**A'BRAHAM**, originally **ABRAM**, the greatest of the Hebrew patriarchs, was born at Ur in Chaldea in 2153 B.C. according to Hales, in 1996 B.C. according to Ussher, while Bunsen says he lived 2850 B.C. He migrated, accompanied by his wife Sarah and his nephew Lot, to Canaan, where he led a nomadic life, which extended over 175 years. His two sons Isaac and Ishmael were the progenitors of the Jews and Arabs respectively.

**ABRAHAM**, Heights or Plains of. See Quebec.

**ABRAX'AS** (or **ABRASAX**) **STONES**, the name given to stones or gems found in Syria, Egypt, and elsewhere, cut into almost every variety of shape, but generally having a human trunk and arms, with a cock's head, two serpents' tails for the legs, etc., and the word Abraxas or Abrasax in Greek characters engraved upon them. They appear to have been first used by the Gnostic sect.

**ABRIDG'MENT**. In the law of copyright an abridgment is deemed a new work, and is not an infringement of the copyright. An abridgment is distinguished in the law of copyright from a compilation. The former is a condensation of the substance, while the latter is a reproduction in part, at least, of the language of the copyrighted article, and is held to be an infringement.

**ABROGA'TION**, the repealing of a law by a competent authority.

**ABRO'MA**, a genus of small trees, natives of India, Java, etc., one species of which has a bark yielding a strong white fiber, from which good cordage is made.

**ABRUPT'**, in botany, terminating suddenly, as if a part were cut short off.

**AB'RUS**, a genus of plants, one species of which has round brilliant scarlet seeds, used to make necklaces and rosaries. Its root is sweetish and mucilaginous, and is used as a substitute for licorice. The seeds yield a strong poison.

**ABRUZZI** (â-brüt'sē), a division of Italy on the Adriatic, between Umbria and the Marches on the north, and Apulia on the south. It is united with Molise to form a *compartimento*, comprising the four provinces of Aquila degli Abruzzi, Campobasso, Chieti, and Teramo. The seacoast of about 80 miles does not possess a single harbor. The interior is rugged and mountainous, being traversed throughout by the Apennines. The lower parts consist of fertile plains and valleys, yielding corn, wine, oil, almonds, saffron, etc.; area, 6380 sq. miles; pop. 1,441,551.

**ABRUZZI**, Prince Luigi Amadeo of Savoy-Aosta, Duke of the, an Italian traveler and arctic explorer, son of ex-King Amadeus of Spain, was born in Madrid in 1873, and studied at the naval college in Leghorn. In 1897 he attracted attention by making the first ascent of Mount St. Elias. On June 12, 1899, he set out on his voyage toward the north pole, his plan being to leave his ship, the *Stella Polare*, in harbor, and send northward a series of sledge expeditions. He spent one winter in the Bay of Teplitz, and would have remained a second had not a serious injury to



the vessel compelled his return. While repairs were being made, one of his sledge parties, under the immediate direction of Captain Umberto Cagni, attained the latitude of  $86^{\circ} 33'$ , 239.15 statute miles from the pole. His explorations determined the northern boundary of Franz-Josef Land and the non-existence of Peterman's Land.

**AB'SALOM**, the third son of King David, whose romantic career makes him a prominent figure in Old Testament history.

**ABSCOND'ING**, the act of leaving the state or concealing oneself therein for a fraudulent purpose, such as hindering, delaying, or defrauding one's creditors. It is not a common-law offense for one to go beyond the boundaries of his country, nor to treat his house as his castle, that is, as a place into which an officer has no right to break in order to serve civil process. But if a debtor went abroad or locked himself in his house to avoid the service of legal process, or if he was about to do either with like intent, the creditor was entitled, upon resorting to the proper proceedings, to seize his property.

**AB'SCESS**, any collection of purulent matter or pus formed in some tissue or organ of the body, and confined within some circumscribed area, of varying size, but always painful and often dangerous.

**ABSENTEE'**, the name which has been given to a person who possesses property in one country, and resides and spends his income in another. This practice is especially prevalent among Irish land-owners, and many political economists have ascribed much of the poverty and discontent in Ireland to absenteeism.

**ABSINTHE**, a liqueur or aromatised spirit, prepared by pounding the leaves and flowering tops of various species of wormwood, with angelica root, sweet flag root, the leaves of dittany of Crete, star-anise fruit, and other aromatics, and macerating these in alcohol. After soaking for about eight days the compound is distilled, yielding an emerald-colored liquor, to which a proportion of an essential-oil, usually that of anise, is added. The chief seat of the manufacture is in the canton of Neuchâtel, in Switzerland, although absinthe distilleries are scattered generally throughout Switzerland and France. The liqueur is chiefly consumed in France, but there is also a considerable export trade to the United States of America. When taken habitually or in excess, its effects are very pernicious. It is a favorite drink of the Parisians.

**AB'SOLUTE**, in a general sense, loosed or freed from all limitations or conditions. In politics, an absolute monarchy is that form of government in which the ruler is unlimited or uncontrolled by constitutional checks. In modern metaphysics the Absolute represents the unconditioned, infinite, and self-existent.

**ABSOLU'TION**, remission of a penitent's sins in the name of God. It is commonly maintained that down to the twelfth century the priests used only what is called the precatory formula,

"May God or Christ absolve thee," which is still the form in the Greek Church; whereas the Roman Catholic uses the expression "I absolve thee," thus regarding the forgiveness of sins as in the power of the priest (the indicative form). This theory of absolution was confirmed by the Council of Trent. The passages of Scripture on which the Roman Catholic Church founds in laying down its doctrine of absolution are such as Matt. xvi. 19; xviii. 18; John xx. 23. Among Protestants absolution properly means a sentence by which a person who stands excommunicated is released from that punishment.

**ABSOR'BENTS**, the system of minute vessels by which the nutritive elements of food and other matters are carried into the circulation of vertebrate animals. The vessels consist of two different sets, called respectively lacteals and lymphatics. The former arise from the digestive tract, the latter from the tissues generally, both joining a common trunk which ultimately enters the blood-vessel system. Absorbents in medicines are substances such as chalk, charcoal, etc., that absorb or suck up excessive secretion of fluid or gas.

**ABSORP'TION**, in physiology, one of the vital functions by which the materials of nutrition and growth are absorbed and conveyed to the organs of plants and animals. In vertebrate animals this is done by the lymphatics and lacteals, in plants chiefly by the roots. See Absorbents.

**ABUSE OF PROCESS**, the wrongful employment of a regular judicial proceeding. Courts of justice, refuse to lend themselves to the abuse of their procedure, and may, accordingly, stay or dismiss actions and strike out defenses which are manifestly frivolous or vexatious.

**AB'STRACT OF TI'TLE**, a statement in writing of the successive conveyances through which a person claims to own a parcel of land. A perfect abstract should furnish a complete history of the title sought to be transferred, showing the origin and nature of the vendor's interest, all incumbrances and other interests, such as mortgages, easements, judgments, trusts, etc., which affect his title. In the United States the public records of conveyances are the principal source of information upon which the maker of the Abstract proceeds.

**AB'STINENCE**. See Fasting, Temperance.

**ABSTRAC'TION**, the operation of the mind by which it disregards part of what is presented to its observation in order to concentrate its attention on the remainder. It is the foundation of the operation of generalization, by which we arrive at general conceptions. In order, for example, to form the conception of a horse, we disregard the color and other peculiarities of the particular horses observed by us, and attend only to those qualities which all horses have in common. In rising to the conception of an animal we disregard still more qualities, and attend only to those which all animals have in common with one another.

**ABSURDUM, REDUCTIO AD**, a mode

of demonstrating the truth of a proposition, by showing that its contradictory leads to an absurdity. It is much employed by Euclid.

**ABT, FRANZ**, born in Prussian Saxony, December 22, 1819; died March 31, 1855. He was educated at Leipzig and became professor of music at Bernburg, Zurich and Weisbaden. He wrote the music of over two hundred popular songs.

**ABU'TILON**, a genus of plants, sometimes called Indian mallows, inhabiting the East Indies, Australia, Brazil, Siberia, etc. Several of them yield a valuable hemp-like fiber. One, a troublesome weed in the Middle United States, has been recommended for cultivation.

**ABU-BEKR**, or Father of the Virgin, the father-in-law and first successor of Mohammed. His right to the succession was unsuccessfully contested by Ali, Mohammed's son-in-law, and a schism took place, which divided the Mohammedans into the two great sects of Sunnites and Shiites, the former maintaining the validity of Abu-Bekr's and the latter that of Ali's claim.

**ABUT'MENT**, the part of a bridge which receives and resists the lateral outward thrust of an arch; the masonry, rock, or other solid materials from which an arch springs.

**ABY'DOS (1)**, an ancient city of Asia Minor, on the Hellespont, at the narrowest part of the strait, opposite Sestos. Leander, say ancient writers, swam nightly from Abydos to Sestos to see his loved Hero—a feat in swimming accomplished also by Lord Byron.—(2), an ancient city of Upper Egypt, about 6 miles west of the Nile, now represented only by ruins of temples, tombs, etc. It was celebrated as the burying-place of the god Osiris, and its oldest temple was dedicated to him. Here, in 1818, was discovered the famous Abydos Tablet, now in the British Museum, and containing a list of the predecessors of Rameses the Great, which was supplemented by the discovery of a similar historical tablet in 1864.

**ABYSSIN'IA**, a country of eastern Africa, which, roughly speaking, may be said to extend from lat.  $8^{\circ}$  to  $16^{\circ}$  n. and lon.  $35^{\circ}$  to  $41^{\circ}$  e.; having Nubia on the n.w., the Soudan on the w., the Red Sea littoral and the Danakil territory on the e., and the country of the Gallas on the s.; total area about 120,000 sq. m.; chief divisions Tigré, Amhara, and Shoa. It is as a whole an elevated region, with a general slope to the northwest. The mountains in various parts of the country rise to 12,000 and 13,000 feet, while some of the peaks are over 15,000 feet (Ras Dashan being 15,160), and are always covered with snow. The principal rivers belong to the Nile basin, the chief being the impetuous Tacazzé ("the Terrible"), in the north, and the Abai in the south, the latter being really the upper portion of the Blue Nile. The principal lake is Lake Tzana or Dembea (from which issues the Abai), upward of 6000 feet above the sea, having a length of about 45 and a breadth of 35 miles. Round this lake lies a fertile plain, emphatically called the granary of the country.—According to elevation there are several zones of vegetation. Within the lowest belt, which reaches



an elevation of 4800 feet, cotton, wild indigo, acacias, ebony, baobabs, sugar-canes, coffee-trees, date-palms, etc., flourish, while the larger animals are lions, panthers, elephants, rhinoceroses,



Abyssinian priest.

hippopotamuses, jackals, hyenas, bears, numerous antelopes, monkeys, and crocodiles. The middle zone, rising to 9000 feet, produces the grains, grasses, and fruits of southern Europe, the orange, vine, peach, apricot, the bamboo, sycamore-tree, etc. The principal grains are millet, barley, wheat, maize, and teff, the latter a small seed, a favorite breadstuff of the Abyssinians. Two, and in some places three, crops are obtained in one year. All the domestic animals of Europe, except swine, are known. There is a variety of ox with immense horns. The highest zone, reaching to 14,000 feet, has but little wood, and generally scanty vegetation, the hardier corn-plants only being grown; but oxen, goats, and long-wooled sheep find abundant pasture.—The climate is as various as the surface, but as a whole is temperate and agreeable; in some of the valleys the heat is often excessive, while on the mountains the weather is cold. In certain of the



Abyssinian chief and soldiers.

lower districts malaria prevails.—The chief mineral products are sulphur, iron, copper, coal, and salt, the latter serving to some extent as money.—There has been a great intermixture of races in

Abyssinia. What may be considered the Abyssinians proper seem to have a blood-relationship with the Bedouin Arabs. The complexion varies from very dark through different shades of brown and copper to olive. The figure is usually symmetrical. Other races are the black Gallas from the south; the Falashas, who claim descent from Abraham, and retain many Jewish characteristics; the Agows, Gongas, etc. The great majority of the people profess Christianity, belonging, like the Copts, to the sect of the Monophysites. Their religion consists chiefly in the performance of empty ceremonies, and gross superstition as well as ignorance prevails. The head of the church is called the Abuna ("our father"), and is consecrated by the Coptic patriarch of Alexandria. Geez or Ethiopian is the language of their sacred books: it has long ago ceased to be spoken. The chief spoken language is the Amharic; in it some books have been published. Mohammedanism appears to be gaining ground in Abyssinia, and in respect of morality the Moslems stand higher than the Christians. A corrupt form of Judaism is professed by the Falashas.—The bulk of the people are devoted to agriculture and cattle-breeding. The trade and manufactures are of small importance. A good deal of common cotton cloth and some finer woven fabrics are produced. Leather is prepared to some extent, silver filagree work is produced, and there are manufactures of common articles of iron and brass, coarse black pottery, etc. The foreign trade is carried on through Zeila (British) and Djibouti (French) on the Gulf of Aden, and Massowa on the Red Sea (Italian), exports being hides, coffee, wax, gum, ivory, etc., imports textile fabrics, firearms, tobacco, etc. The Abyssinians were converted to Christianity in the fourth century, by some missionaries from Alexandria. The title King of Kings was assumed by Johannes in 1881. Advantage was taken of the troubled state of Abyssinia by the Egyptians, who annexed Massowa and the region adjacent, Abyssinia having been thus shut out from the sea. Hostilities were repeatedly carried on between Johannes and the Egyptians. Latterly the Italians gained and hold possession of Massowa and other territory. Johannes died in 1889, and was succeeded by Menelek II., who admitted of an Italian protectorate over Abyssinia; but quarrels and hostilities broke out, the Italians were defeated, and their protectorate ceased. The population is estimated at about 3,500,000.

ACA'CIA, a genus of plants, consisting of trees or shrubs with compound pinnate leaves and small leaflets, growing in Africa, Arabia, the East Indies, Australia, etc. The flowers, usually small, are arranged in spikes or globular heads at the axils of the leaves near the extremity of the branches. Several of the species yield gum-arabic and other gums; some have astringent barks and pods, used in tanning. An Indian species yields the valuable astringent called catechu; another, the wattle-tree of Australia, from 15 to 30 feet in height, is the most beautiful and useful of the

species found there. Its bark contains a large percentage of tannin, and is hence exported. Some species yield valuable timber; some are cultivated for the beauty of their flowers.



Acacia.

ACAD'EMY, an association for the promotion of literature, science, or art; established sometimes by government, sometimes by the voluntary union of private individuals. The name Academy was first applied to the philosophical school of Plato, from the place where he used to teach, a grove or garden at Athens which was said to have belonged originally to the hero Academus. Academies devote themselves either to the cultivation of science generally or to the promotion of a particular branch of study, as antiquities, language, or the fine arts. The most celebrated institutions bearing the name of academies, and designed for the encouragement of science, antiquities, and language respectively, are the French Académie des Sciences (founded by Colbert in 1666), Académie des Inscriptions founded by Colbert in 1663, and Académie Française (founded by Richelieu in 1635), all of which are now merged in the National Institute. The oldest of the academies instituted for the improvement of language is the Italian Accademia della Crusca (now the Florentine Academy), formed in 1582, and chiefly celebrated for the compilation of an excellent dictionary of the Italian language, and for the publication of several carefully prepared editions of ancient Italian poets. In Britain the name of academy, in the more dignified sense of the term, is confined almost exclusively to certain institutions for the promotion of the fine arts, such as the Royal Academy of Arts and the Royal Scottish Academy. The Royal Academy of Arts (usually called simply the Royal Academy) was founded in London in 1768, "for the purpose of cultivating and improving the arts of painting, sculpture, and architecture." The number of academicians is now limited to forty-two, among whom are two



engravers. In the United States there are hundreds of institutions, more or less noted, known as academies, as the American Academy of Political and Social Science, the New York Academy of Design, the Chicago Academy of Sciences, etc.

**ACA'DIA**, the name formerly given to Nova Scotia. It received its first colonists from France in 1604, being then a possession of that country, but it passed to Britain, by the Peace of Utrecht, in 1713. In 1756, 18,000 of the French inhabitants were forcibly removed from their homes on account of their hostility to the British, an incident on which is based Longfellow's *Evangeline*.

**ACALE'PHA**, a nettle, from their stinging properties, a term formerly used to denote the Medusæ or jelly-fishes and their allies.

**ACANTHOP'TERI**, **ACANTHOP'TERYGII**, a group of fishes, distinguished by the fact that at least the



Spines of acanthopteri.

first rays in each fin exist in the form of stiff spines; it includes the perch, mullet, mackerel, gurnard, wrasse, etc.

**ACAN'THUS**, a genus of herbaceous plants or shrubs, mostly tropical, two species of which are characterized by large white flowers and deeply indented



Acanthus of Corinthian capital.

shining leaves.—In architecture the name is given to a kind of foliage decoration said to have been suggested by this plant, and much employed in Roman and later styles.

**ACAR'IDA**, a division of the Arachnida, including the mites, ticks, and water-mites. See *Mite*.

**ACARNA'NIA**, the most westerly portion of northern Greece, together with Ætolia now forming a nomarchy with a pop. of 138,444. The Acarnanians of ancient times were behind the other Greeks in civilization, living by robbery and piracy.

**ACCA'DIANS**, the primitive inhabitants of Babylonia, who had descended from the mountainous region of Elam on the east, and to whom the Assyrians ascribed the origin of Chaldean civilization and writing.

**ACCELE'RATION**, the increase of velocity which a body acquires when

continually acted upon by a force in the direction of its motion. A body falling from a height is one of the most common instances of acceleration.—Acceleration of the Moon, the increase of the moon's mean angular velocity about the earth, the moon now moving rather faster than in ancient times. This phenomenon has not been fully explained, but it is known to be partly owing to the slow process of diminution which the eccentricity of the earth's orbit is undergoing, and from which there results a slight diminution of the sun's influence on the moon's motions.—Diurnal Acceleration of the Fixed Stars, the apparent greater diurnal motion of the stars than of the sun, arising from the fact that the sun's apparent yearly motion takes place in a direction contrary to that of his apparent daily motion. The stars thus seem each day to anticipate the sun by nearly 3 minutes 56 seconds of mean time.

**AC'CENT**, a term used in several senses. In English it commonly denotes superior stress or force of voice upon certain syllables of words, which distinguishes them from the other syllables. Many English words, as *as'pi-ra'tion*, have two accents, a secondary and primary, the latter being the fuller or stronger. Some words, as *in-com'prehen'si-bil'i-ty*, have two secondary or subordinate accents. When the full accent falls on a vowel, that vowel has its long sound, as in *vo'cal*; but when it falls on a consonant, the preceding vowel is short, as in *hab'it*. This kind of accent alone regulates English verse as contrasted with Latin or Greek verse, in which the meter depended on quantity or length of syllables. In books on elocution three marks or accents are generally made use of, the first or acute (') showing when the voice is to be raised, the second or grave (`), when it is to be depressed, and the third or circumflex (^) when the vowel is to be uttered with an undulating sound. In some languages there is no such distinct accent as in English (or German), and this seems to be now the case with French. (—) In music, accent is the stress or emphasis laid upon certain notes of a bar. The first note of a bar has the strongest accent, but weaker accents are given to the first notes of subordinate parts of the bars, as to the third, fifth, and seventh in a bar of eight quavers.

**ACCEPT'ANCE**, in law, the act by which a person binds himself to pay a bill of exchange drawn upon him. No acceptance is valid unless made in writing on the bill, but an acceptance may be either absolute or conditional, that is, stipulating some alteration in the amount or date of payment, or some condition to be fulfilled previous to payment.

**AC'CESS**, right of, the right of a private individual owning land on the shore of a body of water, to the free use of the shore, or the free access to the shore.

**ACCES'SARY**, or **ACCES'SORY**, in law, a person guilty of an offence by connivance or participation, either before or after the act committed, as by command, advice, concealment, etc. An accessory before the fact is one who procures or counsels another to commit

a crime, and is not present at its commission; an accessory after the fact is one who, knowing a felony to have been committed, gives assistance of any kind to the felon so as to hinder him from being apprehended, tried, or suffering punishment. An accessory before the fact may be tried and punished in all respects as if he were the principal. In high treason, all who participate are regarded as principals.

**ACCIDENT**, in law, an occurrence in which a person is hurt or harmed by another without intent or while lawfully engaged under proper precautions for the protection of others.

**ACCIDEN'TALS**, notes introduced in the course of a piece of music in a different key from that in which the passage they occur is principally written. They are represented by the sign of a sharp, flat, or natural immediately before the note which is to be raised or lowered.

**ACCIDENT INSURANCE**, insurance protecting one against injury, disablement, or death from accident. It does not protect from injuries arising from quarrels, or intentionally inflicted injury, but only from such harm as comes from violence and is purely accidental, that is, when the harm is not due to lack of precaution.

**ACCIP'ITRES** (*ak-sip'i-trēz*), the name given by Linnæus and Cuvier to the



Head and foot of the osprey.

Head and foot of peregrine falcon.

Head and foot of American sparrow-hawk.

rapacious birds now usually called *Raptors*, which see.

**ACCLIMATIZA'TION**, the process of accustoming plants or animals to live and propagate in a climate different from that to which they are indigenous, or the change which the constitution of an animal or plant undergoes under new climatic conditions, in the direction of adaptation to those conditions. The systematic study of acclimatization has only been entered upon in very recent times, and the little progress that has been made in it has been more in the direction of formulating anticipative, if not arbitrary hypotheses, than of actual discovery and acquisition of facts. The term is sometimes applied to the case of animals or plants taking readily to a new country with a climate and other and other circumstances similar to what they have left, such as European animals and plants in America and New Zealand: but this is more properly naturalization than acclimatization.

**ACCOLADE** (*ak-o-lād'*), the ceremony used in conferring knighthood, anciently consisting either in the embrace given by the person who conferred the honor of knighthood or in a light blow on the neck or the cheek, latterly consisting



in the ceremony of striking the candidate with a naked sword.

**ACCOMMODATION BILL**, a bill of exchange drawn and accepted to raise money on, and not given, like a genuine bill of exchange, in payment of a debt, but merely intended to accommodate the drawer: colloquially called a kite.

**ACCOMMODATION LADDER**, a light ladder hung over the side of a ship at the gangway to facilitate ascending from, or descending to, boats.

**ACCOM'PANIMENT**, in music, is that part of music which serves for the support of the principal melody (solo or obligato part). This can be executed either by many instruments, by a few, or by a single one.

**ACCOM'PLICE**, an aider or abettor of crime, punishable either as principal or second in the crime. Intent to commit crime is of course understood. Testimony given by accomplices against other participators in the crime is usually regarded with suspicion and must be corroborated by other testimony or circumstances before it is regarded as convincing.

**ACCOR'DION**, a keyed musical wind-instrument similar to the concertina, being in the form of a small box, containing a number of metallic reeds fixed at one of their extremities, the sides of the box forming a folding apparatus which acts as a bellows to supply the wind, and thus set the reeds in vibration, and produce the notes both of melody and harmony.

**ACCOUNT'ANT**, one who keeps accounts; in the United States usually a bookkeeper. In other countries the term is used to designate an expert bookkeeper who inspects the accounts of banks, business houses, and other institutions at regular intervals.

**AC'CRA**, a British settlement in Africa, in a swampy situation, cap. of Gold Coast, about 75 miles east of Cape Coast Castle. Exports gold-dust, ivory, gums, palm-oil; imports cottons, cutlery, etc. Pop. 20,000.

**ACCU'MULATOR**, a name applied to a kind of electric battery by means of which electric energy can be stored and rendered portable. In the usual form each battery forms a cylindrical leaden vessel, containing alternate sheets of metallic lead and minium wrapped in felt and rolled into a spiral wetted with acidulated water. On being charged with electricity the energy may be preserved till required for use.

**ACCU'SATIVE CASE**, in Latin and some other languages, the term applied to the case which designates the object to which the action of any verb is immediately directed, corresponding, generally speaking, to the objective in English.

**A'CER**, the genus of plants to which belong the maples.

**ACETAB'ULUM**, an anatomical term applied to any cup-like cavity, as that of a bone to receive the protuberant end of another bone, the cavity, for instance, that receives the end of the thigh-bone.

**ACETATES** (as'e-tats), salts of acetic acid. The acetates of most commercial or manufacturing importance are those of aluminium and iron, which are used in calico printing; of copper, which as

verdigris is used as a color; and of lead, best known as sugar of lead. The acetates of potassium, sodium, and ammonium, of iron, zinc, and lead, and acetate of morphia, are employed in medicine.

**ACETIC ACID**, an acid produced by the oxidation of common alcohol, and of many other organic substances. Pure acetic acid has a very sour taste and pungent smell, burns the skin, and is poisonous. From freezing at ordinary temperatures (58° or 59°) it is known as glacial acetic acid. Vinegar is simply dilute acetic acid. Acetic acid is largely used in the arts, in medicine, and for domestic purposes. See Vinegar.

**ACETIC ETHERS**, compounds consisting of acetates of alcohol radicals. Common acetic ether is a colorless, volatile fluid, and is a flavoring constituent in many wines. It is made artificially by distilling a mixture of alcohol, oil of vitriol, and acetate of potash.

**ACET'YLENE**, a highly inflammable hydrocarbon gas which can be simply made with calcic carbide and water, and is now coming into use as an illuminant.

**ACHÆ'ANS**, one of the four races into which the ancient Greeks were divided. In early times they inhabited a part of northern Greece and of the Peloponnesus. They are represented by Homer as a brave and warlike people, and so distinguished were they that he usually calls the Greeks in general Achæans. Achaia with Elis now forms a nomarchy of the kingdom of Greece. Pop. 181,632.

**ACHARD** (âh-ârt), Franz Karl, a German chemist, born 1753, died 1821, principally known by his invention (1789-1800) of a process for manufacturing sugar from beet-root.

**ACHEEN'**, or **ATCHIN**, a native state of Sumatra, with capital of same name, in the northwestern extremity of the island, now nominally under Dutch administration. Though largely mountainous, it has also undulating tracts and low fertile plains. By treaty with Britain the Dutch were prevented from extending their territory in Sumatra by conquest; but, this obstacle being removed, in 1871 they proceeded to occupy Acheen. It was not till 1879, however, after a great waste of blood and treasure, that they obtained a general recognition of their authority. But they have not been able to establish it firmly, and in 1885 were forced to evacuate part of the Acheenese territory, with considerable loss in men and guns. In the seventeenth century Acheen was a powerful state, and carried on hostilities successfully against the Portuguese, but its influence decreased with the increase of the Dutch power. The principal exports are rice and pepper. Area, 19,000 sq. miles; pop. 600,000.

**ACHILLES** (a-kil'-ez), a Greek legendary hero, the chief character in Homer's Iliad. His father was Peleus, ruler of Phthia in Thessaly, his mother the sea-goddess Thetis. In discussions on the origin of the Homeric poems the term Achilleid is often applied to those books (i. viii. and xi.-xxii.) of the Iliad in which Achilles is prominent, and which

some suppose to have formed the original nucleus of the poem.

**ACHIMENES** (a-kim'e-nēz), a genus of tropical American plants, with scaly underground tubers, now cultivated in European greenhouses on account of their ornamental character.

**ACHLAMYDEOUS** (ak-la-mid'i-us), in botany, wanting the floral envelopes, that is, having neither calyx nor corolla, as the willow.

**ACHOR** (â'kor), a disease of infants, in which the head, the face, and often the neck and breast become incrustated with thin, yellowish or greenish scabs, arising from minute, whitish pustules, which discharge a viscid fluid.

**ACHROMATIC**, in optics, transmitting colorless light, that is, not decomposed into the primary colors, though having passed through a refracting medium. A single convex lens does not give an image free from the prismatic colors, because the rays of different color making up white light are not equally refrangible, and thus do not all come to a focus together, the violet, for instance, being nearest the lens, the red farthest off. If such a lens of crown-glass, however, is combined with a concave lens of flint-glass—the curvatures of both being properly adjusted—as the two materials have somewhat different optical properties, the latter will neutralize the chromatic aberration of the former, and a satisfactory image will be produced. Telescopes, microscopes, etc., in which the glasses are thus composed are called achromatic.

**ACID**, a name popularly applied to a number of compounds, solid, liquid, and gaseous, having more or less the qualities of vinegar (itself a diluted form of acetic acid), the general properties assigned to them being a tart, sour taste, the power of changing vegetable blues into reds, of decomposing chalk and marble with effervescence, and of being in various degrees neutralized by alkalis.

**ACIERAGE** (â'sē-ēr-āj), a process by which an engraved copper-plate or an electrotype from an engraved plate of steel or copper has a film of iron deposited over its surface by electricity in order to protect the engraving from wear in printing. By this means an electrotype of a fine engraving which, if printed directly from the copper, would not yield 500 good impressions, can be made to yield 3000 or more; and when the film of iron becomes so worn as to reveal any part of the copper, it may be removed and a fresh coating deposited so that 20,000 good impressions may be obtained.

**ACIPENSER** (as-i-pen'ser), the genus of cartilaginous ganoid fishes to which the sturgeon belongs.

**ACKNOWLEDGMENT**, an admission, either in writing or by word of mouth, by a person that he owes a debt which, otherwise, might be covered by the statute of limitations. It is also used to designate an act by which one asserts that a document, statement, or other instrument is his own.

**ACLIN'IC LINE**, the magnetic equator, an irregular curve in the neighborhood of the terrestrial equator, where



the magnetic needle balances itself horizontally, having no dip.

**ACNE** (ak'nē), a skin disease, consisting of small hard pimples, usually on the face, caused by congestion of the follicles of the skin.

**ACOLYTES** (ak'o-lits), in the ancient Latin and Greek Churches, persons of ecclesiastical rank next in order below the sub-deacons, whose office it was to attend to the officiating priest. The name is still retained in the Roman Church.

**ACONCAGUA** (a-kan-kä'gwa), a province, a river, and a mountain of Chile. The peak of Aconcagua, whose summit is just within the Argentine Republic, rises to the height of 22,860 feet, and is probably the highest mountain of the western hemisphere. Area of prov., 6224 sq. miles. Pop. 153,049.

**ACONITE**, a genus of hardy herbaceous plants, represented by the well-known wolf's-bane or monk's-hood, and remarkable for their poisonous properties and medicinal qualities, being used internally as well as externally in rheumatism, gout, neuralgia, etc.

**ACONITINE**, an alkaloid extracted from monk's-hood and some other species of aconite; used medicinally, though a virulent poison.

**ACONQUIJA** (ä-kon-kē'hä), a range of mountains in the Argentine Republic; the name also of a single peak, 17,000 feet high.

**A'CORN**, the fruit of the different kinds of oak. The acorn-cups of one species are brought from the Levant under the name of valonia, and used in tanning.

**ACOTYLE'DONS**, plants not furnished with cotyledons or seed-lobes. They include ferns, mosses, seaweeds, etc., and are also called flowerless plants or cryptogams.

**ACOUSTICS** (a-kou'stiks), the science of sound. It teaches the cause, nature, and phenomena of such vibrations of elastic bodies as affect the organ of hearing; the manner in which sound is produced, its transmission through air and other media, the doctrine of reflected sound or echoes, the properties and effects of different sounds, including musical sounds or notes, and the structure and action of the organ of hearing, etc. The propagation of sound is analogous to that of light, both being due to vibrations which produce successive waves, and Newton was the first to show that its propagation through any medium depended upon the elasticity of that medium. Regarding the intensity, reflection, and refraction of sound, much the same rules apply as in light. In ordinary cases of hearing the vibrating medium is air, but all substances capable of vibrating may be employed to propagate and convey sound. When a bell is struck its vibrations are communicated to the particles of air surrounding it, and from these to particles outside them, until they reach the ear of the listener. The intensity of sound varies inversely as the square of the distance of the body sounding from the ear. Sound travels through the air at the rate of about 1090 feet per second; through water at the rate of about 4700 feet. Sounds may be musical or non-musical. A musical

sound is caused by a regular series of exactly similar pulses succeeding each other at precisely equal intervals of time. If these conditions are not fulfilled the sound is a noise. Musical sounds are comparatively simple, and are combined to give pleasing sensations according to easy numerical relations. The loudness of a note depends on the degree to which it affects the ear; the pitch of a note depends on the number of vibrations to the second which produce the note; the timber, quality or character of a note depends on the body or bodies whose vibrations produce the sound, and is due to the form of the paths of vibrating particles. The gamut is a series of eight notes, which are called by the names Do, Re, Mi, Fa, Sol, La, Si, Do<sub>2</sub>, and the numbers of vibrations which produce these notes are respectively proportional to 24, 27, 30, 32, 36, 40, 45, 48. The numerical value of the interval between any two notes is given by dividing one of the above numbers corresponding to the higher note by the number corresponding to lower note. The intervals from Do to each of the others are called a second, a minor third, a fourth, a fifth, a sixth, a seventh, and an octave respectively. The interval from La to Do<sub>2</sub> is a minor third. An interval of  $\frac{8}{3}$  is a major tone;  $\frac{10}{9}$  is a minor tone;  $\frac{1}{2}$  is called a limma. The properties of sound were mathematically investigated by Bacon and Galileo, but it remained for Newton, Lagrange, Euler, Laplace, Helmholtz, etc., to bring the science to its present state.

**ACRE**, a standard measure of land, consists of 4840 square yards, divided into 4 roods.

**ACRE** (ä'ker), a seaport of Syria, in Northern Palestine, on the Bay of Acre, early a place of great strength and importance. Taken from the Saracens under Saladin in 1191 by Richard I. of England and Philip of France; bravely defended by the Turks assisted by Sir Sidney Smith in 1799 against Napoleon; in 1832, taken by Ibrahim Pasha; in 1840, bombarded by a British, Austrian, and Turkish fleet, and restored to the Sultan of Turkey. Pop. 10,000.

**ACROBAT**, one who performs on the trapeze, horizontal bar, or other apparatus, or who, without appliances of any kind, is capable of performing expert gymnastics. Acrobats and acrobatism are very ancient. They were known, in a limited way, to the Greeks and the Romans and were familiar during the middle ages. Rope walking was a favorite act of acrobats and rope walkers are pictured on the walls of the excavated houses at Pompeii.

**ACROCORIN'THUS**, a steep rock in Greece, nearly 1900 feet high, overhanging ancient Corinth, and on which stood the acropolis or citadel, the sacred fountain of Pirênē being also here. This natural fortress has proved itself of importance in the modern history of Greece.

**AC'ROGENS**, a term applied to the ferns, mosses, and lichens (cryptogams), as growing by extension upwards, in contradistinction to endogens and exogens.

**ACROP'OLIS**, the citadel or chief place of a Grecian city, usually on an

eminence commanding the town. That of Athens contained some of the finest buildings in the world, such as the Parthenon, Erechthëum, etc.

**ACROS'TIC**, a poem of which the first or last, or certain other letters of the line, taken in order, form some name, motto, or sentence. A poem of which both first and last letters are thus arranged is called a double acrostic. In Hebrew poetry, the term is given to a poem of which the initial letters of the lines or stanzas were made to run over the letters of the alphabet in their order, as in Psalm cxix.

**ACT**, in special senses: (1) In dramatic poetry, one of the principal divisions of a drama, in which a definite and coherent portion of the plot is represented; generally subdivided into smaller portions called scenes. The Greek dramas were not divided into acts. The dictum that a drama should consist of five acts was first formally laid down by Horace, and is generally adhered to by modern dramatists in tragedy. In comedy no such distinction is observed.—(2) Something formally done by a legislative or judicial body; a statute or law passed.—(3) In universities, a thesis maintained in public by a candidate for a degree. See Act of God, of Parliament, of Settlement, etc.

**ACTÆ'ON**, in Greek mythology, a great hunter, turned into a stag by Artēmis (Diana) for looking on her when she was bathing, and torn to pieces by his own dogs.

**ACTA SANCTORUM**, a name applied to all collections of accounts of ancient martyrs and saints, both of the Greek and Roman Churches, more particularly to the valuable collection begun by John Bolland, a Jesuit of Antwerp, in 1643, and which, being continued by other divines of the same order (Bollandists), now extends to sixty volumes, the lives following each other in the order of the calendar.

**ACTIN'IA**, the genus of animals to which the typical sea-anemones belong. See Sea-anemone.

**ACTINISM**, the property of those rays of light which produce chemical changes, as in photography, in contradistinction to the light rays and heat rays. The actinic property or force begins among the green rays, is strongest in the violet rays, and extends a long way beyond the visible spectrum.

**ACTINOM'ETER**, an instrument for measuring the intensity of the sun's actinic rays. See Actinism.

**ACTINOZO'A** (lit. ray-animals), a class of animals including sea-anemones, corals, etc., all having rayed tentacles round the mouth.

**ACTION**, the mode of seeking redress at law for any wrong, injury, or deprivation. Actions are divided into civil and criminal, the former again being divided into real, personal, and mixed.

**AC'TIUM**, a promontory on the western coast of northern Greece, not far from the entrance of the Ambracian Gulf (Gulf of Arta), now called La Punta, memorable on account of the naval victory gained here by Octavianus (afterward the Emperor Augustus) over Antony and Cleopatra, September 2, B.C. 31, in sight of their armies, en-



camped on the opposite shores of the Ambracian Gulf. Soon after the beginning of the battle Cleopatra fled with sixty Egyptian ships, and Antony basely followed her, and fled with her to Egypt. The deserted fleet was not overcome without making a brave resistance. Antony's land forces soon went over to the enemy, and the Roman world fell to Octavius.

**ACT OF GOD**, a legal term defined as "a direct, violent, sudden, and irresistible act of nature, which could not, by any reasonable cause, have been foreseen or resisted." No one can be legally called upon to make good loss so arising.

**ACT OF PARLIAMENT**, a law or statute proceeding from the parliament of the United Kingdom passed in both houses, and having received the royal assent. Before it is passed it is a bill and not an act. Acts are either public or private, the former affecting the whole community, the latter only special persons and private concerns. The whole body of public acts constitutes the statute law. An act of parliament can only be altered or repealed by the authority of parliament.

**ACT OF SETTLEMENT**, an act passed by the English parliament in 1700, by which the succession to the throne of the three kingdoms, in the event of King William and Queen Anne dying without issue, was settled on the Princess Sophia, electress of Hanover, and the heirs of her body being Protestants. The Princess Sophia was the youngest daughter of Elizabeth, queen of Bohemia, daughter of James I. By this act George I., son of the Princess Sophia, succeeded to the crown on the death of Queen Anne.

**ACT OF TOLERATION**, an act of parliament passed in 1689, by which Protestant dissenters from the Church of England, on condition of their taking the oaths of supremacy and allegiance, and repudiating the doctrine of transubstantiation, were relieved from the restrictions under which they had formerly lain with regard to the exercise of their religion according to their own forms.

**ACT OF UNIFORMITY**, an English act passed in 1662, enjoining upon all ministers to use the Book of Common Prayer on pain of forfeiture of their livings. See Nonconformists.

**ACTOR**, one who represents some part or character on the stage. Actresses were unknown to the Greeks and Romans in the earliest times, men or boys always performing the female parts. They appeared under the Roman empire, however. Charles II. first encouraged the public appearance of actresses in England; in Shakespeare's time there were none. See Drama.

**ACTS OF THE APOSTLES**, one of the books of the New Testament, written in Greek by St. Luke, probably in A.D. 63 or 64. It embraces a period of about thirty years, beginning immediately after the resurrection, and extending to the second year of the imprisonment of St. Paul in Rome. Very little information is given regarding any of the apostles, excepting St. Peter and St. Paul, and the accounts of them are far from being complete.

**ACTUARY**, an accountant whose business is to make the necessary computations with regard to a basis for life assurance, annuities, reversions, etc.

**ACU'LEUS**, in botany, a prickle, or sharp-pointed process of the epidermis, as distinguished from a thorn or spine, which is of a woody nature.

**ACUPRES'SURE**, a means of arresting bleeding from a cut artery introduced by Sir James Simpson in 1859, and consisting in compressing the artery above the orifice, that is, on the side nearest the heart, with the middle of a needle introduced through the tissues.

**ACUPUNC'TURE**, a surgical operation, consisting in the insertion of needles into certain parts of the body for alleviating pain, or for the cure of different species of rheumatism, neuralgia, eye diseases, etc. It is easily performed, gives little pain, causes neither bleeding nor inflammation, and seems at times of surprising efficacy.

**ADAGIO** (ă-dă'jō), a musical term, expressing a slow time, slower than andante and less so than largo.

**ADAIR**, John, American statesman and soldier, born in South Carolina in 1759, died 1840. He lived many years in Kentucky, took part in the Indian wars toward the end of the 17th century, was a member of the Kentucky convention of 1792, and was a U. S. senator from 1805 to 1806. He was governor of Kentucky from 1820 to 1824, and a member of congress from 1831 to 1832. He was present at the Battle of New Orleans, where he commanded the Kentucky troops.

**ADAM and EVE**, the names given in Scripture to our first parents, an account of whom and their immediate descendants is given in the early chapters of Genesis. Cain, Abel, and Seth are all their sons that are mentioned by name; but we are told that they had other sons, as well as daughters, and that Adam finally died at the age of 930 years. There are numerous Rabbinical additions to the Scripture narrative, of an extravagant character, such as the myth of Adam having a wife before Eve, named Lilith, who became the mother of giants and evil spirits. Other legends or inventions are contained in the Koran.

**ADAM DE LA HALE**, an early French writer and musician; born 1240, died 1287. His *Jeu de Robin et de Marion* may be regarded as the first comic opera ever written.

**AD'AMANT**, an old name for the diamond; also used in a vague way to imply a substance of impenetrable hardness.

**ADAMAN'TINE SPAR**, a name of the mineral corundum or of a brownish variety of it.

**AD'AMITES**, a name of sects or religious bodies that have appeared at various times: so called because both men and women were said to appear naked in their assemblies, either to imitate Adam in the state of innocence or to prove the control which they possessed over their passions.

**ADAMS** Alvin, American business man and capitalist, founder of the Adams Express Company. He was a

native of Andover, Vt.; born in 1804 and died in 1877.

**ADAMS**, Charles Baker, American scientist, born at Dorchester, Mass., in 1814, graduated at Amherst, became professor of natural history at Middlebury College, Vt., in 1838, and in 1847 to his death in 1853 was professor of zoology and astronomy at Amherst.

**ADAMS**, Charles Fallen, American poet, author of *Leedle Yawcob Strauss and Other Poems* (1878), and *Dialect Ballads*. He was born at Dorchester, Vt., in 1842, and served on the Union side in the civil war.

**ADAMS**, Charles Francis, American statesman, son of President John Quincy Adams, born at Boston in 1807, died 1886. He studied law with Daniel Webster, but did not practice, preferring



Charles F. Adams.

literary work and the study of diplomacy and history. From 1841 to 1846 he was a member of the Massachusetts legislature, and 1848 became the editor of the famous Boston Whig. Having been chairman of the Free Soil convention in 1848 he was nominated for vice-president, and after several years of retirement in literary work he entered congress in 1858. In 1861 he was made American minister to England. On his return in 1868 he was elected to the presidency of Harvard, went to Geneva in 1871 to settle the Alabama claims, and on his return retired into private life for the purpose of completing his work of editing the writings of John Quincy Adams.

**ADAMS**, Charles Francis, Jr., American author and financier, born in Boston in 1835. Having served in the civil war, he entered the railroad business, was president of the Southern Pacific railroad (1884 to 1890), and from 1893 to 1895 he was chairman of the Massachusetts Park Commission. He is the author of several works on railroad growth and management.

**ADAMS**, Charles Kendall, American historian and educator, born at Derby, Vt., in 1835, died in 1902. In 1861 he was graduated at the University of



Michigan, where he taught until 1867. He was president of Cornell University from 1885 to 1892, in which latter year he became president of the University of Wisconsin. He is the author of numerous works dealing with European and American history.

**ADAMS, Henry**, American author and historian, son of Charles Francis Adams, born at Boston in 1838 and graduated at Harvard in 1858. He was engaged for many years on his nine-volume work, *History of the United States from 1801 to 1817*. He is also the author of several important historical monographs.

**ADAMS, Herbert Baxter**, American historian and educator, born at Amherst in 1850, died 1901. He was associate professor of history at Johns Hopkins University and wrote a series of monographs on American history of great value.

**ADAMS, Isaac**, an American inventor, born at Rochester, N. H., in 1803. He invented the printing-press named for him. He died in 1883.

**ADAMS, John**, second president of the United States, was born at Braintree (now Quincy), Mass., 19th October, 1735. He was educated at Harvard University, and adopted the law as a



*John Adams*

profession. On 13th May, 1776, he seconded the motion for a declaration of independence proposed by Lee of Virginia, and was appointed a member of committee to draw it up. The declaration was actually drawn up by Jefferson, but it was Adams who fought it through congress. In 1778 he went to France on a special mission, and for nine years resided abroad as representative of his country in France, Holland, and England. After taking part in the peace negotiations he was appointed, in 1785, the first ambassador of the United States to the court of St. James. He was recalled in 1788, and the following year elected vice-president of the republic under Washington. In 1792 he was reelected vice-president, and at the following election in 1797 he became

president in succession to Washington. His term of office proved a stormy one, which broke up and dissolved the federalist party. His reelection in 1801 was again opposed by the efforts of Hamilton, which ended in effecting the return of the republican candidate Jefferson. Thus it happened that when Adams retired from office his influence and popularity with both parties were at an end, and he sunk at once into the obscurity of private life. He had the consolation, however, of living to see his son president. He died 4th July, 1826, the fiftieth anniversary of the declaration of independence, and on the same day as Jefferson.

**ADAMS, John Couch**, English astronomer, born 1819, died 1892, studied at Cambridge, and was senior wrangler in 1843. His investigations into the irregularities in the motion of the planet Uranus led him to the conclusion that they must be caused by another more distant planet, and the results of his labors were communicated in September and October, 1845, to Professor Challis and Airy the astronomer royal. The French astronomer Leverrier had by this time been engaged in the same line of research, and had come to substantially the same results, which, being published in 1846, led to the actual discovery of the planet Neptune by Galle of Berlin. In 1858 Adams was appointed Lowndean professor of astronomy and geometry at Cambridge.

**ADAMS, John Quincy**, sixth president of the United States, son of John Adams, second president, was born 11th July, 1767. Accompanying his father to Europe he received part of his education there, but graduated at Harvard in 1788. Having adopted the legal profession, in 1791, he was admitted to the bar. In 1794 Washington appointed him minister to the Hague. He afterward was sent to Berlin, and also on a mission to Sweden. In 1798 he received a commission to negotiate a treaty of commerce with Sweden. On the accession of Jefferson to the presidency in 1801 he was recalled. The federalist party had sufficient influence in Massachusetts to elect him to the senate in 1803. In 1809 he went as ambassador to Russia. He assisted in negotiating the peace of 1814 with England, and was afterward appointed resident minister at London. Under Monroe as president he was secretary of state, and at the expiration of Monroe's double term of office he succeeded him in the presidency (1825). He was not very successful as president, and at the end of his term (1829) he was not reelected. In 1831 he was returned to congress by Massachusetts, and continued to represent this state till his death, his efforts being now chiefly on behalf of the abolitionist party. He died 21st February, 1848.

**ADAMS, Maude**, an American actress, born at Salt Lake City in 1872. Miss Adams has appeared with great success as Lady Babbie in the *Little Minister*, in *Rostand's l'Aiglon*, and in other prominent productions.

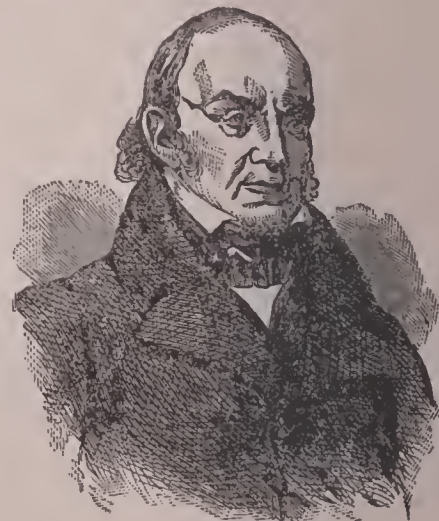
**ADAMS, Samuel**, an American statesman, second cousin of President John Adams, was born in Boston, Sept. 27,

1722, and was educated at Harvard College. He was one of the signers of the declaration of 1776, which he labored most indefatigably to bring forward. He sat in congress eight years, in 1789-94 was lieutenant-governor of Massachusetts, in 1794-97 governor, when he retired from public life. He died Oct. 2, 1803.

**ADAMS, William Taylor**, an American author who, under the pen name of "Oliver Optic," is one of the best known and most popular of American juvenile story tellers. He was born at Medway, Mass., 1822, and began the publication of his stories in 1853. He died in 1897.

**ADAM'S APPLE**, the popular name of the prominence seen in the front of the throat in man, and which is formed by the portion of the larynx known as the thyroid cartilage. It is much smaller and less visible in females than in males, and is so named from the idle notion that it was caused by a piece of the forbidden fruit having stuck in Adam's throat.

**ADAM'S PEAK**, one of the highest mountains in Ceylon, 45 m. east-south-east of Colombo, conical, isolated, and 7420 feet high. On the top, a rocky area of 64 feet by 45, is a hollow in the rock 5 feet long bearing a rude resemblance to a human foot, which the Brahmans



*J. Q. Adams*

believe to be the footprint of Siva, the Buddhists that of Buddha, the Mohammedans that of Adam. Devotees of all creeds here meet and present their offerings (chiefly rhododendron flowers) to the sacred footprint. The ascent is very steep, and toward the summit is assisted by steps cut and iron chains riveted in the rock.

**A'DAR**, the twelfth month of the Hebrew sacred and sixth of the civil year, answering to part of February and part of March.

**ADDA** (ancient Addua), a river of north Italy, which, descending from the Rhætian Alps, falls into Lake Como, and leaving this joins the Po, after a course of about 170 miles.

**ADDA**, a species of lizard, more commonly called skink.



## ADDAX

**AD'DAX**, a species of antelope of the size of a large ass, with much of its make. The horns of the male are about 4 feet long, beautifully twisted into a wide-sweeping spiral of two turns and



Head of Addax.

a half, with the points directed outward. It has tufts of hair on the forehead and throat, and large broad hoofs. It inhabits the sandy regions of Nubia and Kordofan, and is also found in Caffraria.

**ADDER**, a name often applied to the common viper, as well as to other kinds of venomous serpents. See Viper.

**ADDER'S-TONGUE**, a species of fern, whose spores are produced on a spike, supposed to resemble a serpent's tongue.

**ADDER'S-WORT**, name of snake-weed or bistort, from its supposed virtue in curing the bite of serpents.

**ADDICKS**, John Edward, American politician, capitalist, and promoter, born in Philadelphia in 1841. In 1884 he began the organization of gas companies in Boston and elsewhere, and in 1895 he was a candidate for United States senator from Delaware. Defeated at that time, he prevented the election of his opponent. The vacancy was not filled before the expiration of the term of the other senator, so that Delaware was for a time without representation.

**AD'DINGTON**, Henry, Viscount Sidmouth; born 1757, died 1844. Entered parliament, 1783, as a warm supporter of Pitt. Was elected speaker of the House of Commons, 1789, and in 1801 invited by the king to form an administration, chiefly signalized by the conclusion of the Peace of Amiens.

**AD'DISON**, Joseph, an eminent English essayist, son of the Rev. Lancelot Addison, afterward dean of Litchfield, born at Milston, Wiltshire, 1st May, 1672, died 17th June, 1719. He was educated at the Charterhouse, where he became acquainted with Steele, and afterward at Oxford. He held a fellowship from 1697 till 1711, and gained much praise for his Latin poetry and other contributions to classical literature. He secured as his earliest patron the poet Dryden, who inserted some of his verses in his *Miscellanies* in 1693. A translation of the fourth *Georgic*, with the exception of the story of Aristæus, by Addison, appeared in the same collection in 1694, and he subsequently translated for it two and a half books of Ovid. Dryden also prefixed his prose essay on Virgil's *Georgics* to his own translation of that poem, which appeared in 1697. He contributed a number of papers to the *Tatler*, either wholly by himself or

in conjunction with Steele, thus founding the new literary School of the Essayists. For the *Spectator* he wrote 274 papers all signed by one of the four letters C. L. L. O. His tragedy of *Cato* was translated into French, Italian, German and Latin. Of his style as a writer so much has been said that nothing remains to say but to quote the dictum of Johnson, "Whoever wishes to attain an English style, familiar but not coarse, and elegant but not ostentatious, must give his days and nights to the volumes of Addison."

**ADDISON'S DISEASE** (from Dr. Addison, Guy's Hospital, London, who traced the disease to its source), a fatal disease, the seat of which is the two glandular bodies placed one at the front of the upper part of each kidney, and called supra-renal capsules. It is characterized by anæmia or bloodlessness, extreme prostration, and the brownish or olive-green color of the skin. Death usually results from weakness, and commonly within a year.

**ADDUC'TOR**, a muscle which draws one part of the body toward another: applied in zoology to one of the muscles which bring together the valves of the shell of the bivalve molluscs.

**ADE**, George, an American humorist and playwright. He was born at Kentland, Ind., in 1866, graduated at Purdue university in 1887, and was for many years a writer for Chicago newspapers. His first work of note was his *Fables in Slang*, which ran through a long series of publications, and disclosed a power of satire rare in American literature. Mr. Ade more recently has written a large number of comedies and comic opera libretti which have been very popular.

**ADEE**, Alvey Augustus, American diplomat, born at Astoria, N. Y., in 1842. He was secretary of legation at Madrid in 1870 and in 1878 chief of the diplomatic bureau at Washington. From 1882 to 1886 he was third assistant secretary of state and served as acting secretary of state in 1900.

**ADELAIDE** (ad'e-lād), the capital of South Australia, 6 miles east from Port Adelaide (on St. Vincent Gulf), its port, with which it is united by railway, founded in 1837, and named after the queen of William IV. Situated on a large plain, it is built nearly in the form of a square, with the streets at right angles, and is divided into North and South Adelaide, separated by the river Torrens, which is crossed by several bridges, and by means of a dam is converted into a fine sheet of water. Adelaide is connected by railway with Melbourne, and is the terminus of the overland telegraph to Port Darwin. It has a large trade. Pop. (incl. suburbs), about 165,000.

**ADELUNG** (ad'e-lung), Johann Christoph, a German philologist; born 1732, died 1806. In 1759 he was appointed professor in the Protestant academy at Erfurt, and two years after removed to Leipzig, where he applied himself to the works by which he made so great a name, particularly his German dictionary, *Grammatisch-kritisches Wörterbuch der hochdeutschen Mundart* (Leipzig, 1774-86), and his *Mithridates*, a work on general philology. In 1787 he

## ADIRONDACK MOUNTAINS

was appointed librarian of the public library in Dresden—an office which he held till his death.

**A'DEN**, a seaport town and territory belonging to Britain, on the southwest coast of Arabia, in a dry and barren district, the town being almost entirely closed in by an amphitheater of rocks, and possessing an admirable harbor. Occupying an important military position, Aden is strongly fortified and permanently garrisoned. It is of importance also as a coaling station for steamers, and carries on a great amount of commerce, forming an entrepôt and place of transshipment for goods valued at \$20,000,000 a year. The peninsula on which it stands somewhat resembles the rock of Gibraltar, and could be rendered as formidable. The total area of the settlement is 70 square miles. It is attached to the Bombay Presidency. Pop. 43,974.

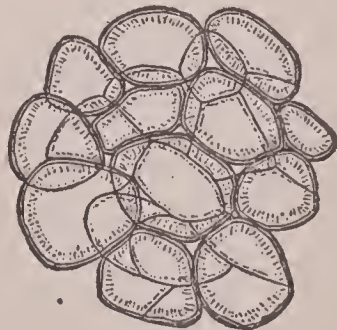
**ADENANTHE'RA**, a genus of trees and shrubs, natives of the East Indies and Ceylon. A. pavonina is one of the largest and handsomest trees of India, and yields hard solid timber called red sandalwood. The bright scarlet seeds, from their equality in weight (each, 4 grains), are used by goldsmiths in the East as weights.

**ADENI'TIS**, in medicine, inflammation of one or more of the lymphatic glands.

**ADHESION**, the tendency of two bodies to stick together when put in close contact, or the mutual attraction of their surfaces; distinguished from cohesion, which denotes the mutual attraction between the particles of a homogeneous body. Adhesion may exist between two solids, between a solid and a fluid, or between two fluids. A plate of glass or of polished metal laid on the surface of water and attached to one arm of a balance will support much more than its own weight in the opposite scale from the force of adhesion between the water and the plate. From the same force arises the tendency of most liquids, when gently poured from a jar, to run down the exterior of a vessel or along any other surface they meet.

**ADIAN'TUM**, a genus of ferns; the maidenhair fern.

**AD'IPOSE TISSUE**, the cellular tissue containing the oily or fatty matter of the body. It underlies the skin, sur-



Addipose tissue.

rounds the large vessels and nerves, invests the kidneys, etc., and sometimes accumulates in large masses.

**ADIRON'DACK MOUNTAINS**, in the U. States, a group belonging to the



Appalachian chain extending from then n.e. corner of the state of New York to near its center. The scenery is wild and grand, diversified by numerous beautiful lakes, and the whole region is a favorite resort of sportsmen and tourists.

**AD'IT**, a more or less horizontal opening, giving access to the shaft of a mine. It is made to slope gradually from the farthest point in the interior to the mouth, and by means of it the principal drainage is usually carried on. See Mine.

**AD'JECTIVE**, in grammar, a word used to denote some quality in the noun or substantive to which it is accessory. The adjective is indeclinable in English (but has degrees of comparison), and generally precedes the noun, while in most other European languages it follows the inflections of the substantive, and is more commonly placed after it, though in German it precedes it, as in English.

**AJUDICA'TION**, in English law, is the decree of the court in bankruptcy declaring a person bankrupt.

**ADJUSTMENT**, in marine insurance, is the settling of the amount of the loss which the insurer is entitled under a particular policy to recover, and if the policy is subscribed by more than one underwriter, of the amounts which the underwriters respectively are liable to pay.

**AD'JUTANT**, an officer appointed to each regiment or battalion, whose duty is to assist the commander. He is charged with instruction in drill, and all the interior discipline, duties, and efficiency of the corps. He has the charge of all documents and correspondence, and is the channel of communication for all orders.

**ADJUTANT-BIRD**, a large grallatorial or wading bird of the stork family, native of the warmer parts of India, where it is known as Hurgila or Argala. It stands about five feet high, has an



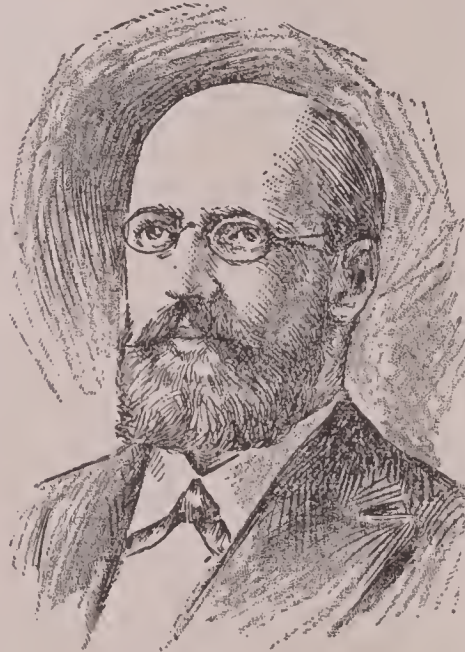
Adjutant-Bird.

enormous bill, nearly bare head and neck, and a pouch hanging from the under part of the neck. It is one of the most voracious carnivorous birds known, and in India, from its devouring all sorts of carrion and noxious animals, is protected by law. From underneath the wings are obtained those light downy

feathers known as marabou feathers, from the name of an allied species of bird inhabiting western Africa, and also producing them.

**ADJUTANT-GENERAL** is the chief staff-officer of an army, charged with the execution of all orders relating to the recruitment, equipment, and efficiency of the troops, and who distributes to them the orders of the day.

**ADLER**, Felix, founder of the Society for Ethical culture, American reformer and lecturer, born in Germany Aug. 13, 1851. He came to the United States in 1857, accompanying his father, who was



Prof. Felix Adler.

called to the pulpit of the Temple Emanuel at New York. Dr. Adler was educated at Columbia College and at Heidelberg, where he received the degree of Ph.D. in 1873. When he organized the Society for Ethical Culture he was professor of Hebrew and Oriental Literature at Cornell University.

**ADMINISTRA'TION**, in politics, the executive power or body, the ministry or cabinet.

**ADMIN'ISTRATOR**, in law, the person to whom the goods of a man dying intestate are committed by the proper authority, and who is bound to account when required.

**AD'MIRAL**, the commander of a squadron or fleet of war ships, or of the whole naval force of a country. The office of admiral varies in its functions and grades in different countries.

In the United States Navy the grades of admiral, vice-admiral, and rear-admiral were established by act of congress, primarily for the purpose of conferring exceptional distinction upon the great naval commander, Captain David Glasgow Farragut. The lowest of these grades, that of rear-admiral, was established in 1862, as was also that of commodore; though the latter had previously existed as a courtesy title without authority of law. The number of rear-admirals on the active list was limited to nine. In 1864 the President was authorized to appoint one of the

rear-admirals a vice-admiral. Under the laws, Captain Farragut became the first commodore, first rear-admiral, and first vice-admiral. In 1899 the number of rear-admirals was increased to eighteen and the grade of commodore on the active list abolished. The act of 1899 fixed the pay of flag officers as follows: Admiral, \$13,500 at sea or on shore; senior nine rear-admirals, \$7500 while at sea, or on shore duty beyond seas, and \$6375 while on shore duty; junior nine rear-admirals, \$5500 while at sea, or on shore duty beyond seas, and \$4675 while on shore duty. The pay of officers on the retired list is seventy-five per centum of their active pay at time of retirement. The number in 1902 on this list was forty-three. The flag of the admiral is a rectangular blue flag with four white stars, and is flown at the main; that of the vice-admiral, flown at the fore, is a similar flag, with three stars. The flag of a rear-admiral, flown at the mizzen, is similar in shape, has two stars, and is usually blue in color, but in case two or more rear-admirals are in company the senior flies a blue flag, the second in rank a red flag, and the junior a white flag.

**AD'MIRALTY**, that department of the government of a country that is at the head of its naval service. In Britain the lords commissioners of the admiralty were formerly seven, but are now five in number, with the addition of a civil lord, at the head being of first lord, and four others being naval lords. The first lord is always a member of the cabinet, and it is he who principally exercises the powers of the department.

**ADMIRALTY CHARTS** are charts issued by the hydrographic department of the admiralty of Britain; they are prepared by specially appointed surveyors and draughtsmen, and, besides being supplied to every ship in the fleet, are sold to the general public at prices much less than their cost. In connection with these charts there are published books of sailing directions, lists of lights, etc. The navigating charts are generally on the scale of half an inch to a mile, and show all the dangers of the coasts with sufficient distinctness to enable the seaman to avoid them; the charts of larger size exhibit all the intricacies of the coast.

**ADMIRALTY COURT**, a court which takes cognizance of civil and criminal causes of a maritime nature, including captures in war made, and offenses committed, on the high seas, and has to do with many matters connected with maritime affairs. In England the admiralty court was once held before the lord high admiral, and at a later period was presided over by his deputy or the deputy of the lords commissioners. It now forms a branch of the probate, divorce, and admiralty division of the High Court of Justice. There is a separate Irish admiralty court. In Scotland admiralty cases are now prosecuted in the Court of Session, or in the sheriff court. In the United States admiralty cases are taken up in the first instance by the district courts.

**ADMIRALTY ISLAND**, an island belonging to the United States off the



northwest coast of North America, 80 or 90 miles long and about 20 broad, covered with fine timber and inhabited by Sioux Indians.

**ADMIRALTY ISLANDS**, a cluster of islands, north of New Guinea, in Bismarck Archipelago, now belonging to Germany. The largest is about 60 miles in length; the rest are much smaller.

**AD'NATE**, in botany, applied to a part growing attached to another and principal part by its whole length, as stipules adnate to the leaf-stalk.

**ADOBE** (a-dō'bā), the Spanish name for a brick made of loamy earth, containing about two-thirds fine sand and one-third clayey dust, sun-dried; in common use for building in Mexico, Texas, and Central America.

**ADOLPHUS OF NASSAU**, elected Emperor of Germany, 1292. In 1298 the college of electors transferred the crown to Albert of Austria, but, Adolphus refusing to abdicate, a war ensued, in which he fell, after a heroic resistance, July 2, 1298.

**ADONAI** (ad'o-nī), a name of Good among the Jews. See Jehovah.

**ADO'NIS**, a mythological personage, originally a deity of the Phœnicians, but borrowed into Greek mythology. He was represented as being a great favorite of Aphroditē (Venus), who accompanied him when engaged in hunting, of which he was very fond. He received a mortal wound from the tusk of a wild boar, and when the goddess hurried to his assistance she found him lifeless, whereupon she caused his blood to give rise to the anemone. The worship of Adonis, which arose in Phœnicia, latterly was widely spread round the Mediterranean. The name Adonis is akin to the Hebrew Adonai, Lord.

**ADOPTION**, the admission of a stranger by birth to the privileges of a child. Among the ancient Greeks and Romans, and also some modern nations, adoption is placed under legal regulation. In many of the states adoption is regulated by law.

**ADRIAN**, the name of six popes. The first, a Roman, ruled from 772 to 795; a contemporary and friend of Charlemagne. He expended vast sums in rebuilding the walls and restoring the aqueducts of Rome.—**ADRIAN II.**, a Roman, was elected pope in 867, at the age of seventy-five years. He died in 872, in the midst of conflicts with the Greek Church.—**ADRIAN III.**, a Roman, elected 884, was pope for one year and four months only. He was the first pope that changed his name on the occasion of his exaltation.—**ADRIAN IV.**, originally named Nicolas Breakspear, the only Englishman that ever occupied the papal chair, was born about 1100, and died 1159. He issued the famous bull (1158) granting the sovereignty of Ireland, on condition of the payment of Peter's pence, to Henry II.—**ADRIAN V.**, of Genoa, settled, as legate of the pope, the dispute between King Henry III. of England and his nobles, in favor of the former; but died a month after his election to the papal chair (1276).—**ADRIAN VI.**, born at Utrecht in 1459, was elected to the papal chair, January 9, 1522. He tried to reform abuses in the church, but opposed the zeal of

Luther with reproaches and threats, and even attempted to excite Erasmus and Zuinglius against him. Died 1523, after a reign of one year and a half.

**A'DRIAN**, a town of the United States, in Michigan, 70 miles w.s.w. of Detroit. Its extensive water-power is employed in works of various kinds. Pop. 10,000.

**A'DRIAN**, Publius Ælius Hadrianus See Hadrian.

**ADRIANO'PLE**, an important city of Turkey in Europe. Adrianople received its present name from the Roman emperor Adrian (Hadrian). In 1361 it was taken by Amurath I., and was the residence of the Turkish sovereigns till the conquest of Constantinople in 1453. In 1829 it was taken by the Russians, and here was then concluded the peace of Adrianople, by which Russia received important accessions of territory in the Caucasus and on the coast of the Black Sea. The Russians occupied it also in 1878. Pop. 60,000.

**ADRIAN'S** (or **HADRIAN'S**) **WALL**. See Roman Walls.

**ADRIAT'IC SEA**, or **GULF OF VENICE**, an arm of the Mediterranean, stretching in a northwesterly direction from the Straits of Otranto, between Italy and the Turkish and Austrian dominions. Length, about 480 miles; average breadth, about 100; area, about 60,000 square miles. The rivers which it receives, particularly the Po, its principal feeder, have produced, and are still producing, great geological changes in its basin by their alluvial deposits. Hence Adria, between the Po and the Adige, which gives the sea its name, though once a flourishing seaport, is now 17 miles inland. The principal trading ports on the Italian side are Brindisi, Bari, Ancona, Sinigaglia, and Venice; on the east side Ragusa, Fiume, Pirano, Pola, and Trieste.

**ADULA'RIA**, a very pure, limpid, translucent variety of the common felspar, called by lapidaries moonstone, on account of the play of light exhibited by the arrangement of its crystalline structure. It is found on the Alps, but the best specimens are brought from Ceylon.

**ADUL'LAM**, Cave of, a cave to which David fled when persecuted by Saul, and whither he was followed by "every one who was in distress, in debt, or discontented" (1 Sam. xxii. 1, 2).

**ADULTERATION**, a term not only applied in its proper sense to the fraudulent mixture of articles of commerce, food, drink, drugs, seeds, etc., with noxious or inferior ingredients, but also by magistrates and analysts to accidental impurity, and even in some cases to actual substitution. The chief objects of adulteration are to increase the weight or volume of the article, to give a color which either makes a good article more pleasing to the eye or else disguises an inferior one, to substitute a cheaper form of the article, or the same substance from which the strength has been extracted, or to give it a false strength.—Among the adulterations which are practiced for the purpose of fraudulently increasing the weight or volume of an article are the following: Bread is adulterated with alum or sulphate of copper, which gives solidity to the gluten of

damaged or inferior flour; with chalk or carbonate of soda to correct the acidity of such flour; and with boiled rice or potatoes, which enables the bread to carry more water, and thus to produce a larger number of loaves from a given quantity of flour. Wheat flour is adulterated with other inferior flours, as the flour from rice, bean, Indian-corn, potato, and with sulphate of lime, alum, etc. Milk is usually adulterated with water. The adulterations generally present in butter consist of an undue proportion of salt and water, lard, tallow, and other fats; when of poor quality it is frequently colored with a little annatto, and, at times, with the juice of carrots. Genuine butter should not contain less than 80 per cent of butter-fat. Cheese is also colored with annatto and other substances. Tea is adulterated (chiefly in China) with sand, iron-filings, chalk, gypsum, China clay, exhausted tea leaves, and the leaves of the sycamore, horse-chestnut, and plum, while color and weight are added by black-lead, indigo, Prussian-blue (one of the deleterious ingredients used by the Chinese in converting the lowest qualities of black into green teas), gum, turmeric, soapstone, catechu, and other substances. Coffee is mingled with chicory, roasted wheat, roasted beans, acorns, mangel-wurzel, rye-flour, and colored with burned sugar and other materials. Chicory is adulterated with different flours, as rye, wheat, beans, etc., and colored with ferruginous earths, burned sugar, Venetian red, etc. Cocoa and chocolate are mixed with the cheaper kinds of arrow-root, animal matter, corn, sago, tapioca, etc. Sugar (moist) may be adulterated to some extent with sand and flour. Tobacco is mixed with sugar and treacle, aloes, licorice, oil, alum, etc., and such leaves as rhubarb, chicory, cabbage, burdock, coltsfoot, besides excess of salt and water. Snuffs are adulterated with carbonate of ammonia, glass, sand, coloring matter, etc. Confections are adulterated with flour and sulphate of lime. Preserved vegetables are kept green and poisoned by salts of copper. The acidity of mustard is commonly reduced by flour, and the color of the compound is improved by turmeric. Pepper is adulterated with linseed-meal, flour, mustard husks, etc. Color is given to pickles by salts of copper, acetate of copper, etc. Ale is adulterated with common salt, grains of paradise, quassia, and other bitters, sulphate of iron, alum, etc. Porter and stout are mixed with sugar, treacle, salt, and an excess of water. Brandy is diluted with water, and burned sugar is added to improve the color; sometimes bad whisky is flavored and colored so as to resemble brandy, and sold under its name. Gin is mixed with excess of water, and flavoring matters of various kinds, with alum and tartar, are added. Rum is diluted with water, and the flavor and color are kept up by the addition of cayenne and burned sugar. For champagne gooseberry and other inferior wines are often substituted. Port is manufactured from red Cape and other inferior wines, the body, flavor, strength, and color being produced by gum-dragon, the washings of brandy



casks, and a preparation of German bilberries. Cheap brown sherry is mixed with Cape and other low-priced brandies and is flavored with the washings of brandy casks, sugar-candy, and bitter almonds. Pale sherries are produced by gypsum, by a process called plastering, which removes the natural acids as well as the color of the wine. Other wines are adulterated with elderberry, logwood, Brazil-wood, cudbear, red beetroot, etc., for color; with lime or carbonate of lime, carbonate of soda, carbonate of potash, and litharge, to correct acidity; with catechu, sloe-leaves, and oak-bark for astringency; with sulphate of lime and alum for removing color; with cane-sugar for giving sweetness and body; with alcohol for fortifying; and with ether, especially acetic ether, for giving bouquet and flavor.—Medicines, such as jalap, opium, rhubarb, chinchona bark, scammony, aloes, sarsaparilla, squills, etc., are mixed with various foreign substances. Castor-oil has been adulterated with other oils; and inferior oils are often mixed with cod-liver oil. Cantharides are often mixed with golden-beetle and also artificially-colored glass.—The adulteration of seeds is largely practised also, the seed which forms the adulterant being of course of the most worthless kind that can be had. Thus turnip-seed is mixed with rape, wild mustard, or charlock, which are steamed and kiln-dried to destroy their vitality, so as to evade detection in the progress of growth; old and useless turnip-seed is also used fraudulently mixed with fresh seeds. Clover is also much mixed with plantain and mere weeds.

**ADUL'TERY**, the voluntary sexual intercourse of a married person with any other than the offender's husband or wife; when committed between two married persons, the offense is called double, and when between a married and a single person, single adultery. The Mosaic, Greek, and early Roman law only recognized the offense when a married woman was the offender. By the Jewish law it was punished with death. A man can obtain a dissolution of his marriage on the ground of his wife's adultery, and a wife can obtain a judicial separation on the ground of her husband's adultery, or a dissolution of the marriage if the offense is coupled with cruelty, desertion, or bigamy. In the United States the punishment of adultery has varied materially at different times. It is, however, very seldom punished criminally.

**AD VALO'REM**, a term applied to customs or duties levied according to the worth of the goods, as sworn to by the owner, and not according to number, weight, measure, etc.

**ADVANCEMENT OF SCIENCE ASSOCIATIONS**, organizations to encourage scientific research in all of its departments. The most prominent associations for the advancement of science are those of the United States, Great Britain, and France. Those of the two last mentioned countries are now consolidated and occasionally hold international meetings, the first of which took place at Paris in 1900. The American Association for the Advancement of

Science, now one of the most noted scientific societies of America, was founded in 1847 as an outgrowth of the association of American geologists and naturalists. The association is organized in ten sections, each of which holds its own convention at the annual meeting of the association during the summer. The sections embrace the following departments of science: A, mathematics and astronomy; B, physics; C, chemistry; D, mechanical science and engineering; E, geology and geography; F, zoology; G, botany; H, anthropology and experimental medicine. The association also serves as a center for the meeting of a number of important special scientific societies which have become connected with it. The association publishes annually a volume of proceedings, and in 1901 became affiliated with the journal *Science*, making it the semi-official organ of the society. The membership of the society is about 3,000. The British Association for the Advancement of Science was founded in the city of York in 1831, under the leadership of David Brewster and with the cooperation of many of the most prominent men of the time. The annual meetings of the association are held for a week each summer, and consist mainly of papers read before the several sections of the society and of conferences following them.

**AD'VENT**, the name applied to the holy season which occupies the four or, according to the Greek Church, six weeks preceding Christmas, and which forms the first portion of the ecclesiastical year, as observed by the Anglican, the R. Catholic and the Greek Church.

**AD'VENTISTS**, a small religious sect of the United States, who believe in the speedy coming of Christ, and generally practice adult immersion.—There is also a sect called Seventh-day Adventists, who hold that the coming of Christ is at hand, and maintain that the Sabbath is still the seventh day of the week.

**AD'VERB**, one of the parts of speech used to limit or qualify the signification of an adjective, verb, or other adverb; as, very cold, naturally brave, much more clearly, readily agreed. Adverbs may be classified as follows: 1, adverbs of time, as, now, then, never, etc.; 2, of place, as, here, there, where, etc.; 3, of degree, as, very, much, nearly, almost, etc.; 4, of affirmation, negation, or doubt, as, yes, no, certainly, perhaps, etc.; 5, of manner, as, well, badly, clearly, etc.

**ADVER'TISEMENT**, a notice given to individuals or the public of some fact, the announcement of which may affect either the interest of the advertiser or that of the parties addressed. The vehicle employed is generally special bills or placards and notices inserted in newspapers and periodicals, and the profit derivable from advertisements forms the main support of the newspaper press.

**AD'VOCATE**, a lawyer authorized to plead the cause of his clients before a court of law. It is only in Scotland that this word seems to denote a distinct class belonging to the legal profession, the advocates of Scotland being the pleaders before the supreme courts.

**ADVOCA'TUS DIAB'OLI** (Devil's advocate), in the Roman Catholic Church, a functionary who, when a deceased person is proposed for canonization, brings forward and insists upon all the weak points of the character and life of the deceased, endeavoring to show that he is not worthy of sainthood. The opposite side is taken by the *Advocatus Dei*, God's advocate.

**ADZ**, a cutting instrument used for chipping the surface of timber, somewhat of a mattock shape, and having a blade of steel forming a portion of a cylindrical surface, with a cutting edge at right angles to the length of the handle.

**ÆGAG'RUS**, a wild species of ibex found in troops on the Caucasus, and many Asiatic mountains, believed to be the original source of at least one variety of the domestic goat.

**ÆGEAN SEA** (ē-jē'an), that part of the Mediterranean which washes the eastern shores of Greece, the southern coast of Turkey, and the western coast of Asia Minor. See Archipelago.

**Æ'GILOPS**, a genus of grasses, very closely allied to wheat, and somewhat remarkable from the alleged fact that by cultivation one of the species becomes a kind of wheat.

**ÆGINA** (ē-jī'na), a Greek island in the Gulf of Ægina, south of Athens, triangular in form; area about 32 square miles; pop. 8200.

**ÆGIS** (ē'jis), the shield of Zeus, according to Homer, but according to later writers and artists a metal cuirass or breastplate, in which was set the head of the Gorgon Medusa, and with which Athena (Minerva) is often figured as being protected.

**ÆNE'AS**, the hero of Virgil's *Æneid*, a Trojan, who, according to Homer, was, next to Hector, the bravest of the warriors of Troy. His son, Æneas Sylvius, was the ancestor of the kings of Alba Longa, and of Romulus and Remus, the founders of the city of Rome.

**ÆOLIAN HARP**, or **ÆOLUS' HARP**, a musical instrument, generally consisting of a box of thin fibrous wood, to which are attached from eight to fifteen fine catgut strings or wires, stretched on low bridges at each end, and tuned in unison. Its length is made to correspond with the size of the window or other aperture in which it is intended to be placed. When the wind blows athwart the strings it produces very beautiful sounds, sweetly mingling all the harmonic tones, and swelling or diminishing according to the strength or weakness of the blast.

**ÆOLIANS**, one of the four races into which the ancient Greeks were divided, originally inhabiting the district of Æolis, in Thessaly, from which they spread over other parts of Greece.

**Æ'OLUS**, in Greek mythology, the god of the winds, which he kept confined in a cave in the Æolian Islands, releasing them when he wished or was commanded by the superior gods.

**Æ'ON**, a Greek word signifying life, an age, and sometimes eternity, but used by the Gnostics to express spirits or powers that had emanated from the Supreme Mind before the beginning of time.



**ÆPYOR'NIS**, a genus of gigantic birds whose remains have been found in Madagascar, where it is supposed to have lived perhaps not longer than 200 years ago. It had three toes, and is classed with the cursorial birds (ostrich, etc.). Its eggs measured 14 inches in length, being about six times the bulk of those of the ostrich. The bird which laid them may well have been the roc of Eastern tradition.

**Æ'ERATED BREAD**, bread which receives its sponginess or porosity from carbonic acid supplied artificially, and not produced by the fermentation caused by leaven or yeast.

**Æ'ERATED WATERS**, waters impregnated with carbonic acid gas, and forming effervescing beverages. Some mineral waters are naturally aerated, as Vichy, Apollinaris, Rosbach, etc.; others, especially such as are used for medicinal purposes, are frequently aerated to render them more palatable and exhilarating. Water simply aerated, or aerated and flavored with lemonade or fruit syrups, is largely used, especially in summer, as a refreshing beverage. There are numerous varieties of apparatus for manufacturing aerated waters.

**AERODYNAM'ICS**, a branch of physical science, which treats of the properties and motions of elastic fluids (air, gases), and of the appliances by which these are exemplified. This subject is often explained in connection with hydrodynamics.

**AEROE**, or **ARROE** (är'eu-e), an island of Denmark, in the Little Belt, 15 miles long by 5 broad, with 12,000 inhabitants. Though lilly, it is very fertile.

**Æ'EROLITE**, a meteoric stone, meteorite, or shooting-star. See Meteoric Stones.

**AERONAUT'ICS**. See Airships.

**AEROSTATIC PRESS**, a simple contrivance for rendering the pressure of the atmosphere available for extracting the coloring matter from dye-woods and similar purposes.

**AEROSTAT'ICS**, that branch of physics which treats of the weight, pressure, and equilibrium of air and gases. See Air, Air-pump, Barometer, Gas, etc.

**ÆSCHINES** (ēs'ki-nēz), a celebrated Athenian orator, the rival and opponent of Demosthenes, was born 390 B.C. and died in 314. Three of his orations are extant.

**ÆSCHYLUS** (ēs'ki-lus), the first in time of the three great tragic poets of Greece, born at Eleusis, in Attica, B.C. 525, died in Sicily 456. Before he gained distinction as a dramatist he had highly distinguished himself at the battle of Marathon (490), as he afterward did at Artemisium, Salamis, and Plataea. He first gained the prize for tragedy in B.C. 484. The Persians, the earliest of his extant pieces, formed part of a trilogy which gained the prize in B.C. 472. In B.C. 468 he was defeated by Sophocles, and then is said to have gone to the court of Hiero, king of Syracuse. Æschylus may be called the creator of Greek tragedy, both from the splendor of his dramatic writings, and from the scenic improvements and accessories he introduced. Till his time only one actor had appeared on the stage at a time,

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and by bringing on a second he was really the founder of dramatic dialogue.

**ÆSCULA'PIUS**, the god of medicine among the Greeks and latterly adopted by the Romans, usually said to have been a son of Apollo. He was worshiped in particular at Epidaurus, in Peloponnesus, where a temple with a grove was dedicated to him.

**ÆS'CULUS**, the genus of plants to which belongs the horse-chestnut.

**Æ'SOP**, the Greek fabulist, is said to have been a contemporary of Cræsus and Solon, and thus probably lived about the middle of the sixth century B.C. But so little is known of his life that his existence has been called in question. He is said to have been originally a slave, and to have received his freedom from a Samian master, Iadmon. No works of Æsop are extant, and it is doubtful whether he ever wrote any. The supposition is that his fables were delivered orally and perpetuated by repetition. Such fables are spoken of both by Aristophanes and Plato.

**ÆSTHET'ICS**, the philosophy of the beautiful; the name given to the branch of philosophy or of science which is concerned with that class of emotions, or with those attributes, real or apparent, of objects generally comprehended under the term beauty, and other related expressions. The term æsthetics first received this application from Baumgarten (1714-1762), a German philosopher, who was the first writer to treat systematically on the subject, though the beautiful had received attention at the hands of philosophers from early times.

**ÆSTIVA'TION**, a botanical term applied to the arrangement of the parts of a flower in the flower-bud previous to the opening of the bud.—The term is also applied to the summer sleep of animals. See Dormant State.

**Æ'THRIOSCOPE**, an instrument for measuring radiation toward a clear sky, consisting of a metallic cup with a highly-polished interior of paraboloidal shape, in the focus of which is placed one bulb of a differential thermometer, the other being outside. The inside bulb at once begins to radiate heat when exposed to a clear sky, and the extent to which this takes place is shown by the scale of the thermometer. The æthrioscope also indicates the presence of invisible aqueous vapor in the atmosphere, radiation being less than when the air is dry.

**ÆT'NA**. See Etna.

**AFFIDA'VIT**, a written statement of facts upon oath or affirmation. Affidavits are generally made use of when evidence is to be laid before a judge or a court, while evidence brought before a jury is delivered orally. The person making the affidavit signs his name at the bottom of it, and swears that the statements contained in it are true. The affidavit may be sworn to in open court, or before a magistrate or other duly qualified person.

**AFFIN'ITY**, in chemistry, the force by which unlike kinds of matter combine so intimately that the properties of the constituents are lost, and a compound with new properties is produced. Of the force itself we know little or

nothing. It is not the same under all conditions, being very much modified by circumstances, especially temperature. The usual effect of increase of temperature is to diminish affinity and ultimately to cause the separation of a compound into its constituents; and there is probably for every compound a temperature above which it could not exist but would be broken up. Where two elements combine to form a compound heat is almost always evolved, and the amount evolved serves as a measure of the affinity. In order that chemical affinity may come into play it is necessary that the substances should be in contact, and usually one of them at least is a fluid or a gas. The results produced by chemical combination are endlessly varied. Color, taste, and smell are changed, destroyed, or created; harmless constituents produce strong poisons, strong poisons produce harmless compounds.

**AFFINITY**, in law, is that degree of connection which subsists between one of two married persons and the blood relations of the other. It is no real kindred (consanguinity). A person cannot, by legal succession, receive an inheritance from a relation by affinity; neither does it extend to the nearest relations of husband and wife so as to create a mutual relation between them. The degrees of affinity are computed in the same way as those of consanguinity or blood. All legal impediments arising from affinity cease upon the death of the husband or wife, excepting those which relate to the marriage of the survivor.

**AFFIRMA'TION**, a solemn declaration by Quakers and others, who object to taking an oath, in confirmation of their testimony in courts of law, or of their statements on other occasions on which the sanction of an oath is required of other persons.

**AFGHANISTAN** (äf-gän'i-stän), that is, the land of the Afghans, a country in Asia, bounded on the east by the N. W. Frontier Prov., etc., on the south by Beluchistan, on the west by the Persian province of Khorasan, and on the north by Bokhara and Russian Turkestan. Recently the boundary from the Oxus to the Persian frontier was surveyed and marked off by a Russian and British commission; farther east to the Chinese frontier it was settled in 1895. The area may be set down at about 280,000 sq. miles. The population is estimated at between 4,000,000 and 5,000,000. Afghanistan consists chiefly of lofty, bare, uninhabited tablelands, sandy barren plains, ranges of snow-covered mountains, offsets of the Hindu Kush or the Himalayas, and deep ravines and valleys. Many of the last are well watered and very fertile, but about four-fifths of the whole surface is rocky, mountainous, and unproductive. There are numerous practicable avenues of communication between Afghanistan and India, among the most extensively used being the famous Khyber Pass, by which the river Cabul enters the Punjab; the Gomul Pass, also leading to the Punjab; and the Bolan Pass on the south, through which the route passes to Sind. Of the rivers the



largest is the Helmund, which flows in a south-westerly direction more than 400 miles, till it enters the Hamoon or Seistan swamp. Next in importance are the Cabul in the northeast, which



Afghans.

drains to the Indus, and the Hari Rud in the northwest, which, like other Afghan streams, loses itself in the sand. The climate is extremely cold in the higher, and intensely hot in the lower regions, yet on the whole it is salubrious. The most common trees are pines, oaks, birch, and walnut. In the valleys fruits, in the greatest variety and abundance, grow wild. The principal crops are wheat, forming the staple food of the people; barley, rice, and maize. Other crops are tobacco, sugar-cane, and cotton. The chief domestic animals are the dromedary, the horse, ass, and mule, the ox, sheep with large fine fleeces and enormous fat tails, and goats; of wild animals there are the tiger, bears, leopards, wolves, jackal, hyena, foxes, etc. The chief towns are Cabul (the capital), Kandahar, Ghuzni, and Herat. The inhabitants belong to different races, but the Afghans proper form the great mass of the people. They are allied in blood to the Persians, and are divided into a number of tribes, among which the Duranis and Ghiljis are the most important. The Afghans are bold, hardy, and warlike, fond of freedom and resolute in maintaining it, but of a restless, turbulent temper, and much given to plunder. Tribal dissensions are constantly in existence, and seldom or never do all the Afghans pay allegiance to the nominal ruler of their country. Their language is distinct from the Persian, though it contains a great number of Persian words, and is written, like the Persian, with the Arabic characters. In religion they are Mohammedans of the Sunnite sect. The history of Afghanistan is mainly modern. The British have attempted to control the country and its ruler, called the Ameer, since 1839. The present Ameer is friendly to Britain, but he has been found very difficult to restrain from intrigues with Russia. He is virtually autocrat of his domains.

**AFRICA**, one of the three great divisions of the Old World, and the

second in extent of the five principal continents of the globe, forming a vast peninsula joined to Asia by the Isthmus of Suez. It is of a compact form, with few important projections or indentations, and having therefore a very small extent of coast-line (about 16,000 miles, or much less than that of Europe) in proportion to its area. This continent extends from 37° 20' n. lat. to 34° 50' s. lat., and the extreme points, Cape Blanco and Cape Agulhas, are nearly 5000 miles apart. From west to east, between Cape Verde, lon. 70° 34' w., and Cape Guardafui, lon. 51° 16' e., the distance is about 4600 miles. The area is estimated at 11,500,000 square miles, or more than three times that of Europe. The islands belonging to Africa are not numerous, and, except Madagascar, none of them are large. They include Madeira, the Canaries, Cape Verde Islands, Fernando Po, Prince's Island, St. Thomas, Ascension, St. Helena, Mauritius, Bourbon, the Comoros, Socotra, etc.

The most striking feature of northern Africa is the immense tract known as the Sahara or Great Desert, which is inclosed on the north by the Atlas Mountains (greatest height, 12,000 to 13,000 feet), the plateau of Barbary and that of Barca, on the east by the mountains along the west coast of the Red Sea, on the west by the Atlantic Ocean, and on the south by the Soudan. The Soudan, which lies to the south of the Sahara, and separates it from the more elevated plateau of southern Africa, forms a belt of pastoral country across Africa, and includes the countries on the Niger, around Lake Tchad (or Chad), and eastward to the elevated region of Abyssinia. Southern Africa as a whole is much more fertile and well watered than northern Africa, though it also has a desert tract of considerable extent (the Kalahari Desert).

The Nile is the only great river of Africa which flows to the Mediterranean. It receives its waters primarily from the great lake Victoria Nyanza, which lies under the equator, and in its upper course is led by tributary streams of great size, but for the last 1200 miles of its course it has not a single affluent. It drains an area of more than 1,000,000 square miles. The Indian Ocean receives numerous rivers; but the only great river of South Africa which enters that ocean is the Zambesi, the fourth in size of the continent, and having in its course the Victoria Falls, one of the greatest waterfalls in the world. In southern Africa also, but flowing westward and entering the Atlantic, is the Congo, which takes origin from a series of lakes and marshes in the interior, is fed by great tributaries, and is the first in volume of all the African rivers, carrying to the ocean more water than the Mississippi. Unlike most of the African rivers, the mouth of the Congo forms an estuary. Of the other Atlantic rivers, the Sengal, the Gambia, and the Niger are the largest, the last being third among African streams.

With the exception of Lake Tchad there are no great lakes in the northern division of Africa, whereas in the number and magnificence of its lakes the

southern division almost rivals North America. Here are the Victoria and Albert Nyanza, Lakes Tanganyika, Nyassa, Shirwa, Bangweolo, Moero, and other lakes. Of these the Victoria and Albert belong to the basin of the Nile; Tanganyika, Bangweolo, and Moero to that of the Congo; Nyassa, by its affluent the Shiré, to the Zambesi. Lake Tchad on the borders of the northern desert region, and Lake Ngami on the borders of the southern, have a remarkable resemblance in position, and in the fact that both are drained by streams that lose themselves in the sand.

The climate of Africa is mainly influenced by the fact that it lies almost entirely within the tropics. In the equatorial belt, both north and south, rain is abundant and vegetation very luxuriant, dense tropical forests prevailing for about 10° on either side of the line. To the north and south of the equatorial belt the rainfall diminishes, and the forest region is succeeded by an open pastoral and agricultural country. This is followed by the rainless regions of the Sahara on the north and the Kalahari Desert on the south, extending beyond the tropics, and bordering on the agricultural and pastoral countries of the north and south coasts, which lie entirely in the temperate zone. The low coast regions of Africa are almost everywhere unhealthy, the Atlantic coast within the tropics being the most fatal region to Europeans.

Among mineral productions may be mentioned gold, which is found in the rivers of western Africa (hence the name Gold Coast), and in southern Africa, most abundantly in the Transvaal; diamonds have been found in large numbers in recent years in the south; iron, copper, lead, tin, and coal are also found.—Among plants are the baobab, the date-palm (important as a food plant in the north), the doum-palm, the oil-palm, the wax-palm, the shea-butter tree, trees yielding caoutchouc, the papyrus, the castor-oil plant, indigo, the coffee-plant, heaths with beautiful flowers, aloes, etc. Among cultivated plants are wheat, maize, millet, and other grains, cotton, coffee, cassava, ground-nut, yam, banana, tobacco, various fruits, etc. As regards both plants and animals, northern Africa, adjoining the Mediterranean, is distinguished from the rest of Africa in its great agreement with southern Europe.—Among the most characteristic African animals are the lion, hyena, jackal, gorilla, chimpanzee, baboon, African elephant (never domesticated, yielding much ivory to trade), hippopotamus, rhinoceros, giraffe, zebra, quagga, antelopes in great variety and immense numbers.—Among birds are the ostrich, the secretary-bird or serpent-eater, the honey-guide cuckoo, sacred ibis, guinea fowl.—The reptiles include the crocodile, chameleon, and serpents of various kinds, some of them very venomous.—Among insects are locusts, scorpions, the tsetse-fly whose bite is so fatal to cattle, and white-ants.

The great races of which the population of Africa mainly consists are the Hamites, the Semites, the Negroes, and the Bantus. To the Semitic stock be-















# HUNTING BIG GAME IN AFRICAN WILDS



A Heavy Trophy—the Head of an East African Rhinoceros



A Hartebeest of the British East African Highlands



Head of a Large Rhinoceros



An East African Rhinoceros



Enormous Buffalo Head



Vermin in East Africa—a Leopard



A Fine Lion Shot in British East Africa



An East African Tusker near Port Florence

GREAT HERDS OF ZEBRAS, GAZELLES, GIRAFFES, OSTRICHES, HIPPOPOTAMI, LIONS AND ELEPHANTS ROAM AT THEIR PLEASURE



long the Arabs, who form a considerable portion of the population in Egypt and along the north coast, while a portion of the inhabitants of Abyssinia are of the same race (though the blood is considerably mixed). The Hamites are represented by the Copts of Egypt, the Berbers, Kabyles, etc., of northern Africa, and the Somâli, Danâkil, etc., of eastern Africa. The Negro races occupy a vast territory in the Soudan and central Africa, while the Bantus occupy the greater part of southern Africa from a short distance north of the equator, and include the Kaffres, Bechuanas, Swahili, and allied races. In the extreme southwest are the Hottentots and Bushmen (the latter a dwarfish race), distinct from the other races as well as, probably, from each other. In Madagascar there is a large Malay element. To these may be added the Fulahs on the Niger and the Nubians on the Nile and elsewhere, who are of a brownish color, and are often regarded as distinct from the other races, though sometimes classed with the Negroes. In religion a great proportion of the inhabitants are heathens of the lowest type; Mohammedanism numbers a large number of adherents in North Africa, and is rapidly spreading in the Soudan; Christianity prevails only among the Copts, the Abyssinians, and the natives of Madagascar, the latter having been converted in recent times. Elsewhere the missionaries seem to have made but little progress. Over great part of the continent civilization is at a low ebb, yet in some parts the natives have shown considerable skill in agriculture and various mechanical arts, as in weaving and metal working. Of African trade two features are the caravans that traverse great distances, and the trade in slaves that still widely prevails, and is accompanied by an immense amount of bloodshed. Among articles exported from Africa are palm-oil, diamonds, ivory, ostrich feathers, wool, cotton, gold, esparto, caoutchouc, etc. The population is estimated at 170,000,000. Of these a small number are of European origin—French in Algeria, British and Dutch at the southern extremity.

Great areas in Africa have recently been apportioned among European powers as protectorates or spheres of influence. Among states still more or less independent are Morocco, Abyssinia, Bornu, Waday, Bagirmi, Liberia. To Britain belong the Cape Colony, Natal, and the recently independent Orange River Colony and Transvaal, with Rhodesia, etc.; farther north, a region in eastern Africa extending from the sea to Lake Victoria and the headwaters of the Nile, Sierra Leone; and other settlements on the west coast, Mauritius, etc.; to France belong Algeria and Tunis, Senegambia, part of Sahara, territory north of the Lower Congo, Madagascar, etc.; the Portuguese possess Angola on the west coast and Mozambique on the east; Germany has considerable tracts on the east, the southwest and the western coasts; to Turkey nominally belong Egypt, Barca, and Tripoli; Italy has a territory on the Red Sea, and part of Somaliland; Spain has a part of the coast of the Sahara; the

Congo Free State is under the king of Belgium; Zanzibar is now a British protectorate.

Africa has an ancient history and was colonized by the Greeks and the Romans. Modern exploration began with Mungo Park in 1795 and has continued down to present times through the labors of Lander, Overweg, Barth, Speke, Livingstone, and Stanley.

**AGAMEM'NON**, in Greek mythology, son of Atreus, King of Mycenæ and Argos, brother of Menelaus, and commander of the allied Greeks at the siege of Troy. Returning home after the fall of Troy, he was treacherously assassinated by his wife, Clytemnestra, and her paramour, Ægisthus. He was the father of Orestes, Iphigenia, and Electra.

**AGAMOGENESIS** (-jen'e-sis), the production of young without the congress of the sexes, one of the phenomena of alternate generation. See Generation.

**AGANIPPE** (-nip'ē), a fountain on Mount Helicon, in Greece, sacred to the Muses, which had the property of inspiring with poetic fire whomever drank of it.

**AGAPE** (ag'a-pē), in ecclesiastical history, the love-feast or feast of charity, in use among the primitive Christians, when a liberal contribution was made by the rich to feed the poor.

**AGAPEMONE** (ag-a-pem'o-nē), the name of a singular conventual establishment which has existed at Spaxton, near Bridgewater, Somersetshire, since 1859, the originator of it being a certain Henry James Prince, at one time a clergyman of the Church of England, who called himself the Witness of the First Resurrection. The life spent by the inmates appears to be a sort of religious epicureanism.

**A'GAR-A'GAR**, a dried seaweed of the Asiatic Archipelago, much used in the East for soups and jellies, and also by the paper and silk manufacturers of eastern Asia as an ingredient in some classes of their goods.

**AGAR'IC**, a large and important genus of fungi, characterized by having a fleshy cap or pileus, and a number of radiating plates or gills on which are produced the naked spores. The majority of this species are furnished with stems, but some are attached to the objects on which they grow by their pileus. Over a thousand species are known, and are arranged in five sections according as the color of their spores is white, pink, brown, purple, or black. Many of the species are edible, like the common mushroom, and supply a delicious article of food, while others are deleterious and even poisonous.

**AGARIC MINERAL**, or **MOUNTAIN-MEAL**, one of the purest of the native carbonates of lime, found chiefly in the clefts of rocks and at the bottom of some lakes in a loose or semi-indurated form resembling a fungus. The name is also applied to a stone of loose consistence found in Tuscany, of which bricks may be made so light as to float in water, and of which the ancients are supposed to have made their floating

bricks. It is a hydrated silicate of magnesium, mixed with lime, alumina, and a small quantity of iron.

**AGASSIZ** (ag'as-ē), Louis John Rudolph, an eminent naturalist, born 1807, died 1873, son of a Swiss Protestant clergyman at Motiers, near the eastern extremity of the Lake of Neuchâtel.



L. Agassiz.

His attention was first specially directed to ichthyology by being called on to describe the Brazilian fishes brought to Europe from Brazil by Martius and Spix. His researches led him to propose a new classification of fishes, which he divided into four classes, distinguished by the characters of the skin, as ganoids, placoids, cycloids, and ctenoids. His system has not been generally adopted, but the names of his classes have been used as useful terms. In 1836 he began the study of glaciers, and in 1840 he published his *Etudes sur les Glaciers*, in 1847 his *Système Glaciaire*. From 1838 he had been professor of natural history at Neuchâtel, when in 1846 pressing solicitations and attractive offers induced him to settle in America, where he was connected as a teacher first with Harvard University, Cambridge, and latterly with Cornell University as well as Harvard. After his arrival in America he engaged in various investigations and explorations, and published numerous works. In 1865-66 he made zoological excursions and investigations in Brazil, which were productive of most valuable results. Agassiz held views on many important points in science different from those which prevailed among the scientific men of the day, and in particular he strongly opposed the evolution theory.

**AGASSIZ** (ag'a-sē), Mount, an extinct volcano in Arizona, U. S., 10,000 feet in height; a place of summer resort, near the Great Cañon of the Colorado.

**AG'ATE**, a siliceous semi-pellucid compound mineral, consisting of bands or layers of various colors blended together, the base generally being chalcedony, and this mixed with variable proportions of jasper, amethyst, quartz, opal, heliotrope, and carnelian. The varying manner in which these materials



are arranged causes the agate when polished to assume some characteristic appearances, and thus certain varieties are distinguished, as the ribbon agate, the fortification agate, the zone agate, the star agate, the moss agate, the clouded agate, etc.

**AGATHAR'CHUS**, a Greek painter, native of Samos, the first to apply the rules of perspective to theatrical scene-painting; flourished about 480 B.C.

**AGATHOCLES** (a-gath'o-klēz), a Sicilian Greek, one of the boldest adventurers of antiquity, born 361 B.C. By his ability and energy, and being entirely unscrupulous, he raised himself from the position of a potter to that of sovereign of Syracuse and master of Sicily. Wars with the Carthaginians were the chief events of his life. He died (was poisoned) at the age of seventy-two, or, as some say, ninety-five.

**AGAVE** (a-gā'vē), a genus of plants (which includes the daffodil and narcissus), popularly known as American aloes. They are generally large, and have a massive tuft of fleshy leaves with



American aloe.

a spiny apex. They live for many years—ten to seventy, according to treatment—before flowering. When this takes place the tall flowering stem springs from the center of the tuft of leaves, and grows very rapidly until it reaches a height of 15, 20, or even 40 feet, bearing toward the end a large number of flowers. The best-known species, is the common American aloe, introduced into Europe 1561, and now extensively grown in the warmer parts of the continent as well as in Asia (India in particular). This and other species yield various important products. The sap when fermented yields a beverage resembling cider, called by the Mexicans pulque. The leaves are used for feeding cattle; the fibers of the leaves (called pita, sisal hemp, or henequen) are formed into thread, cord, and ropes; an extract from the leaves is used as a substitute for soap; slices of the withered flower-stem are used as razor-strops.

**AGE**, a period of time representing the whole or a part of the duration of

any individual thing or being, but used more specifically in a variety of senses. In law age is applied to the periods of life when men and women are enabled to do that which before, for want of years and consequently of judgment, they could not legally do. Full age in male or female is twenty-one years, which age is completed on the day preceding the anniversary of a person's birth, who till that time is an infant, and so styled in law.

The term is also applied to designate the successive epochs or stages of civilization in history or mythology. Hesiod speaks of five distinct ages: 1. The golden or Saturnian age, a patriarchal and peaceful age. 2. The silver age, licentious and wicked. 3. The brazen age, violent, savage, and warlike. 4. The heroic age, which seemed an approximation to a better state of things. 5. The iron age, when justice and honor had left the earth. The term is also used in such expressions as the dark ages, the middle ages, the Elizabethan age, etc.

The Archæological Ages or Periods are three—the Stone Age, the Bronze Age, and the Iron Age—these names being given in accordance with the materials chiefly employed for weapons, implements, etc., during the particular period. The Stone Age of Europe has been subdivided into two—the Palæolithic or earlier, and Neolithic or later. The word age in this sense has no reference to the lapse of time, but simply denotes the stage at which a people has arrived in its progress toward civilization; thus there are races still in their stone age.

**AGENT**, one who acts for another. In law, an agent is always supposed to be acting by authority from his principal, and the relation is held to imply a contract between the two. Briefly the law as to agents may be stated as follows: A principal is liable for all the acts of his agent as if these acts had been done by himself, whether these acts be authorized or not. But, if the third party enters into a contract with the agent under the agent's own name, the principal is not held liable, unless the acts of the agent be included under the scope of the authority received from the principal.

**AGERATUM** (a-jer'a-tum), a genus of composite plants of the warmer parts of America, one species of which is a well-known flower-border annual with dense lavender-blue heads.

**AGESILAUS** (a-jes-i-lā'us), a king of Sparta, born in 442 B.C., and elevated to the throne after the death of his brother Agis II. He acquired renown by his exploits against the Persians, Thebans, and Athenians. Though a vigorous ruler, and almost adored by his soldiers, he was of small stature and lame from his birth. He died in Egypt in the winter of 361–360 B.C. Xenophon, Plutarch, and Cornelius Nepos are among his biographers.

**AGGLOMERATE**, in geology, a collective name for masses consisting of angular fragments ejected from volcanoes. When the mass consists of fragments worn and rounded by water it is called a conglomerate.

**AG'GREGATE**, a term applied in geology to rocks composed of several different mineral constituents capable of being separated by mechanical means, as granite, where the quartz, felspar, and mica can be separated mechanically. In botany it is applied to flowers composed of many small florets having a common undivided receptacle, the anthers being distinct and separate, the florets commonly standing on stalks, and each having a partial calyx.

**AGINCOURT** (ā-zhan-kör), a village of northern France, department Pas de Calais, famous for the battle of October 25, 1415, between the French and English. Henry V., king of England, eager to conquer France, landed at Harfleur, took the place by storm, and wished to march through Picardy to Calais, but was met by a French army under the Constable d'Albert. The English numbered about 15,000 men, while the French numbers are variously stated at from 50,000 to 150,000. The confined nature and softness of the ground were to the disadvantage of the French, who were drawn up in three columns unnecessarily deep. The English archers attacked the first division in front and in flank, and soon threw them into disorder. The second division fled on the fall of the Duc d'Alençon, who was struck down by Henry himself, and the third division fled without striking a blow. Of the French 10,000 were killed, including the Constable d'Albert, with six dukes and princes. The English lost 1600 men killed, among them the Duke of York, Henry's uncle. After the battle the English continued their march to Calais.

**AGIO** (ā'ji-o), the difference between the real and the nominal value of money, as between paper money and actual coin: an Italian term originally.

**AG'NATES**, in the civil law relations on the male side, in opposition to cognates, relations on the female side.

**AGNES**, St., a saint, who, according to the story, suffered martyrdom because she steadfastly refused to marry the son of the prefect of Rome, and adhered to her religion in spite of repeated temptations and threats, A.D. 303. She was first led to the stake, but as the flames did not injure her she was beheaded. Her festival is celebrated on the 21st of January.

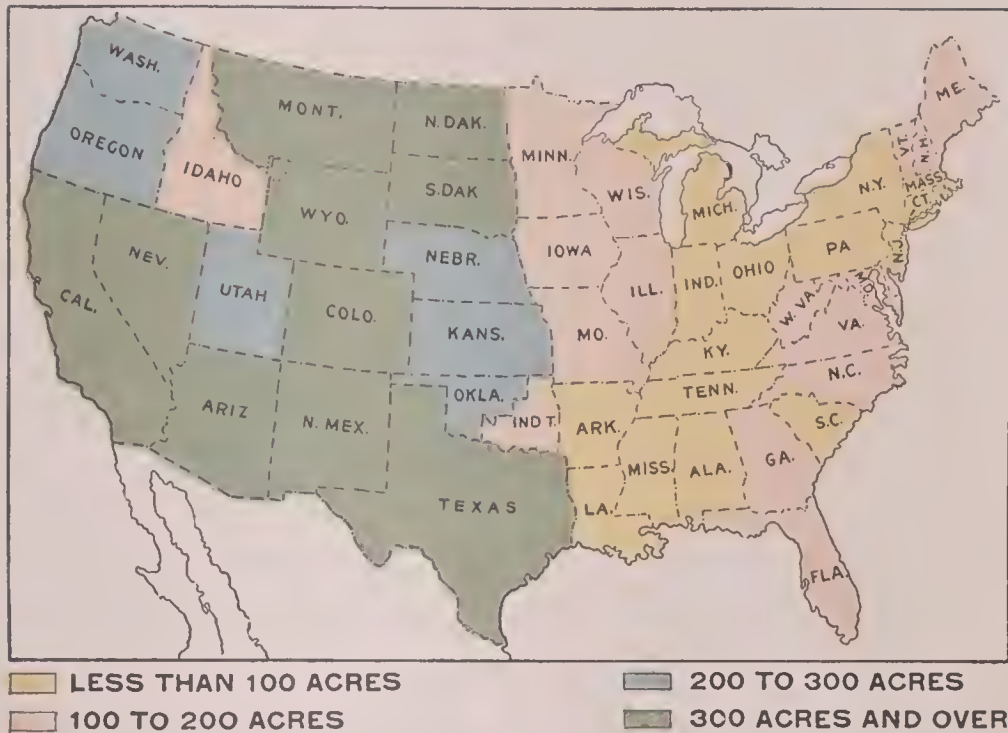
**AGNES**, St., the most southerly of the Scilly Islands. A lighthouse was erected here as early as 1680; another on the Wolf Rock near the island was completed in 1858.

**AG'NI**, the Hindu god of fire, one of the eight guardians of the world, and especially the lord of the southeast quarter. He is celebrated in many of the hymns of the Rig Veda. He is often represented as of a red or flame color, and rides on a ram or a goat. He is still worshiped as the personification of fire.

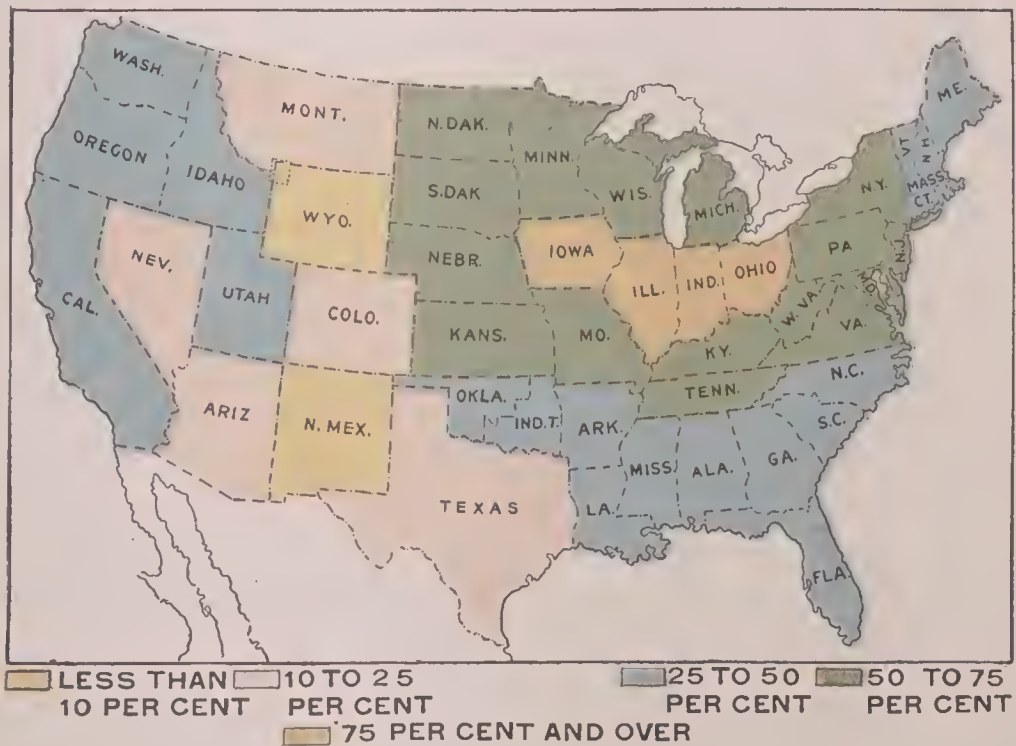
**AGNOSTICS** (ag-nos'tiks), a modern term applied to those who disclaim any knowledge of God or of the origin of the universe, holding that the mind of man is limited to a knowledge of phenomena and of what is relative, and that, therefore, the infinite, the absolute, and the unconditioned, being beyond all experience, are consequently beyond its range.



## AVERAGE SIZE OF FARMS

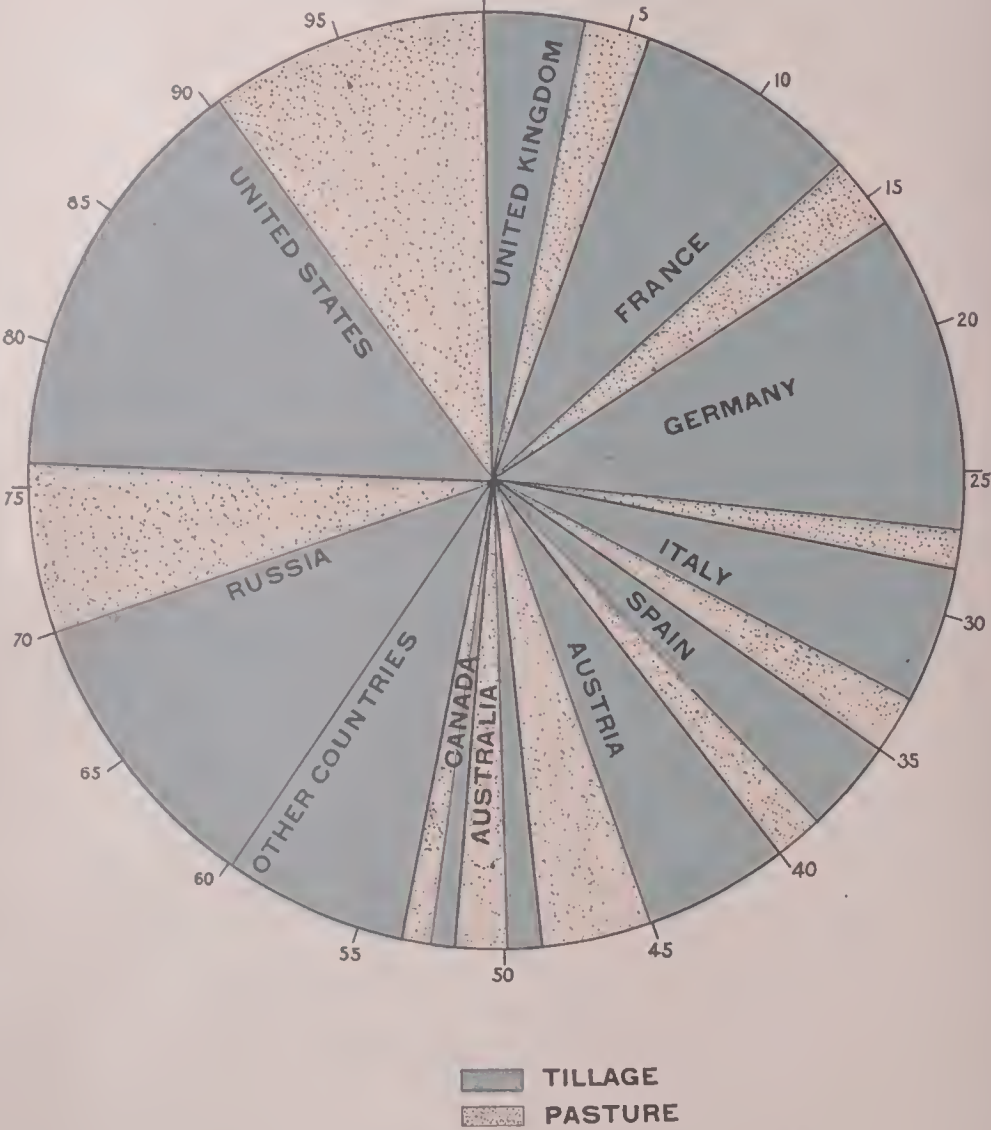


### PROPORTION OF IMPROVED LAND TO TOTAL AREA





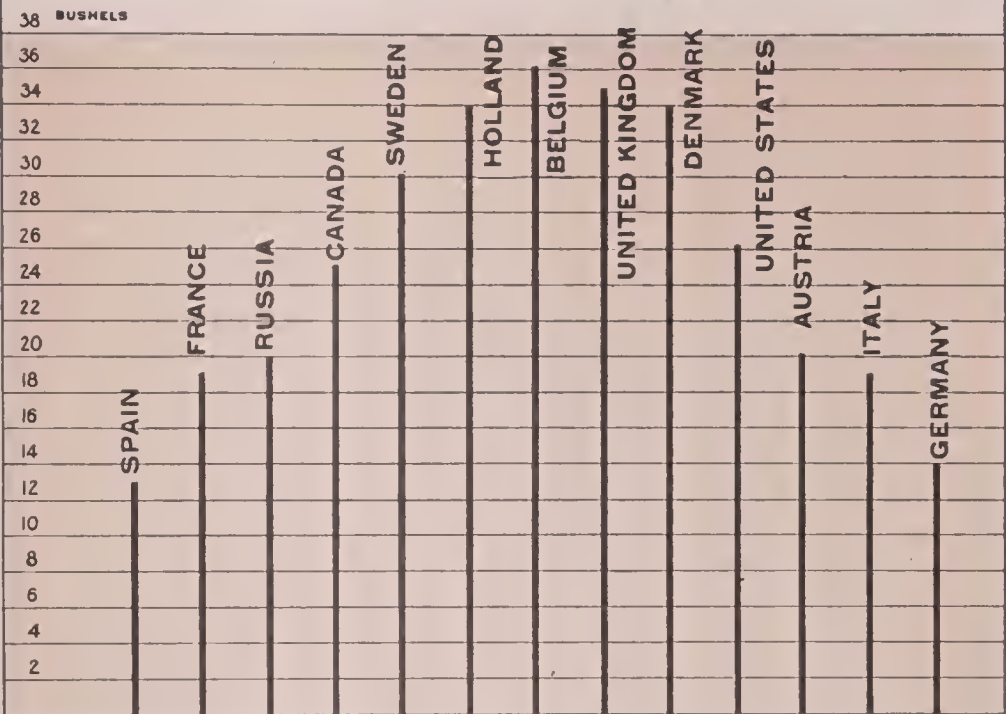
VALUE OF AGRICULTURAL PRODUCTS



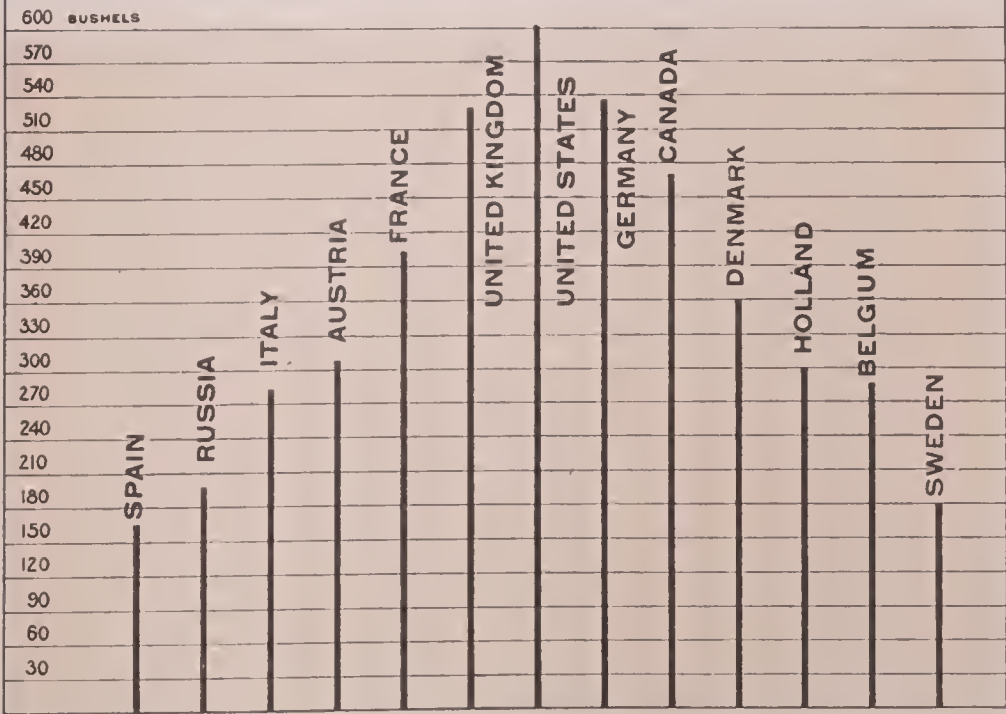


AGRICULTURE

PRODUCTION OF GRAIN PER ACRE

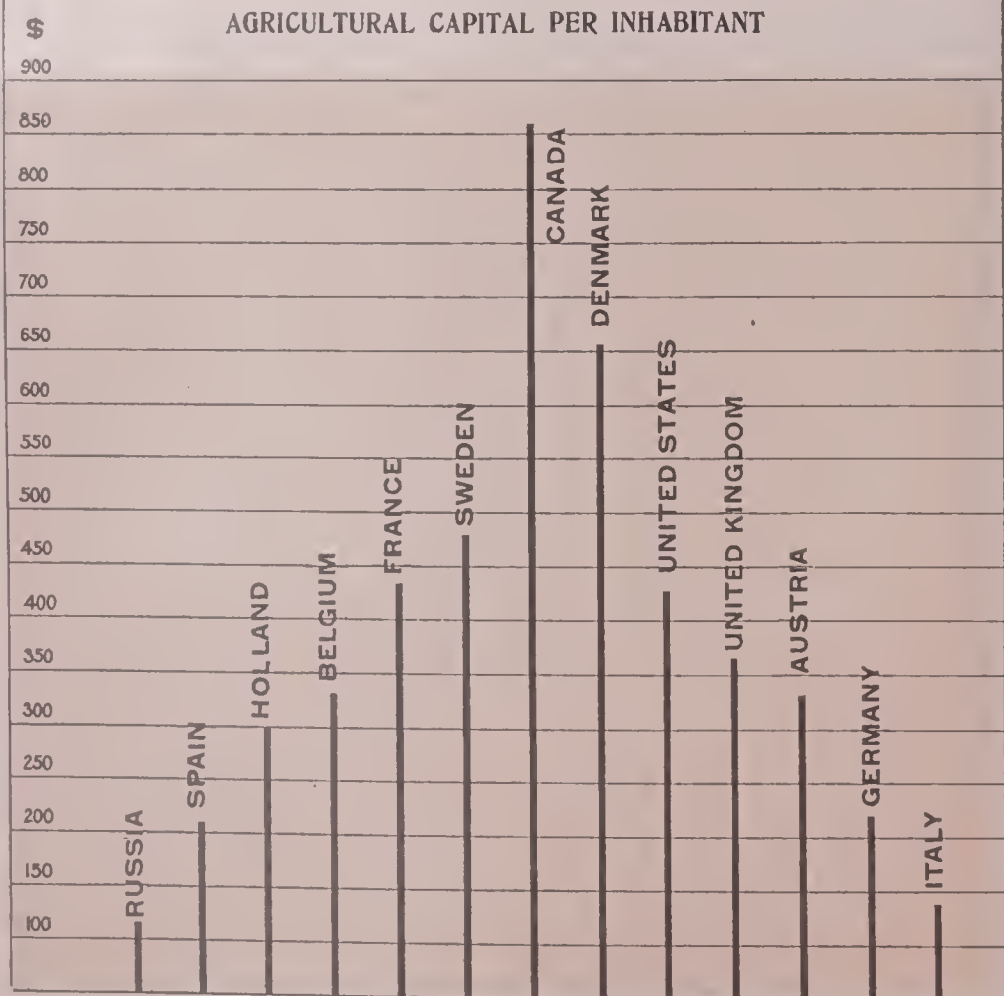
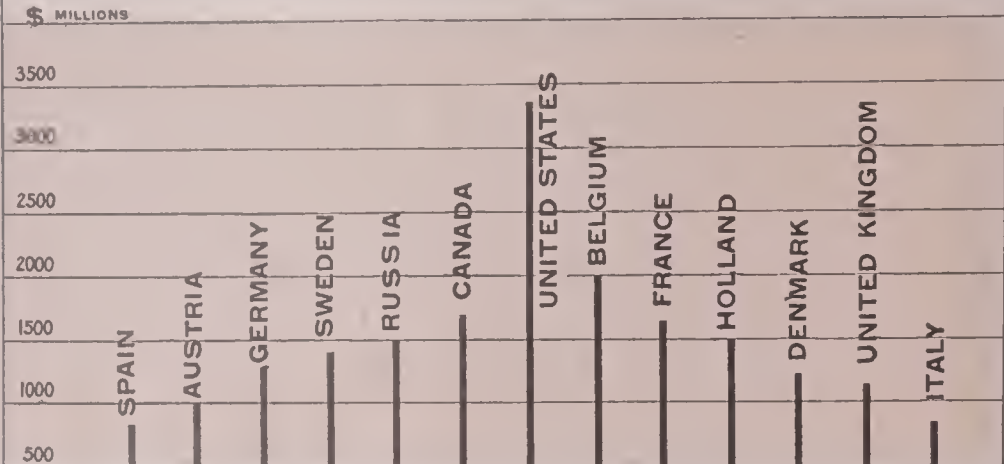


BUSHELS OF GRAIN PER FARMING HAND





AGRICULTURAL CAPITAL







STEAM PLOW.

No longer does the mule pull the plow of the up-to-date farmer. Instead he uses an automobile plow. The one here shown plows ten furrows each time it traverses the length of the field, doing the work not only more speedily but also more evenly than could be done by the old-fashioned plow of a generation ago, which the steam plow excels as completely as did the plow of that age excel the wooden plow of the Egyptians.









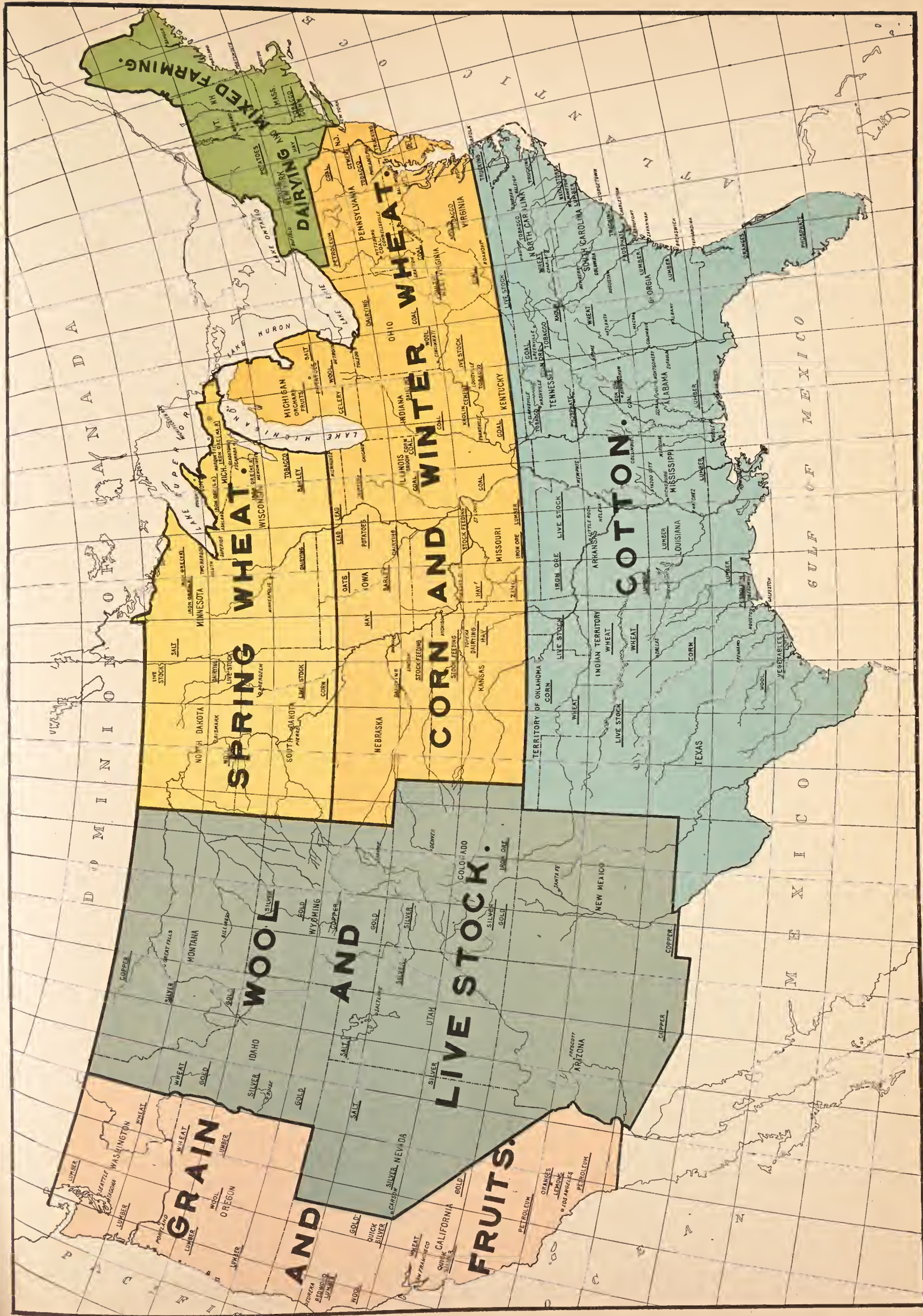
ANOTHER VIEW OF THE PLOW.







THE PRODUCTIVE AREAS OF PRINCIPAL COMMERCIAL STAPLES OF THE U. S.







#### MODERN METHODS OF FARMING.

So enormous are some of the great American Farms that the sight of forty reapers and binders harvesting the crop of a single field is not uncommon. The work must be done expeditiously lest a change in the weather should damage the crop. These American-made harvesting machines are used throughout the whole of the civilized world.



**AGNUS CASTUS**, a shrub, a native of the Mediterranean countries, with white flowers and acrid, aromatic fruits. It had anciently the imagined virtue of preserving chastity—hence the term castus.

**AGNUS DEI** (dē'i), a term applied to Christ in John i. 29, and in the Roman Catholic liturgy a prayer beginning with the words "Agnus Dei," generally sung before the communion. The term is also



Agni.

commonly given to a medal, or more frequently a cake of wax, consecrated by the pope, stamped with the figure of a lamb supporting the banner of the cross; supposed to possess great virtues, such as preserving those who carry it in faith from accidents, etc.

**AGON'IC LINE**, in terrestrial magnetism a name applied to the line which joins all the places on the earth's surface at which the needle of the compass points due north and south, without any declination. This line, which varies from time to time, at present passes through S. America and N. America to the Magnetic North Pole, thence to the White Sea, south through the Persian Gulf, Indian Ocean, and Australia to the Southern Magnetic Pole.

**AGOUARA** (ā-gū-ā'rā), a name given to the crab-eating racoon of S. America.

**AGOUTA** (a-gō'ta), an insectivorous mammal peculiar to Hayti, of the tanrec family, somewhat larger than a rat. It has the tail devoid of hair and covered with scales, the eyes small, and an elongated nose like the shrews. Another species belongs to Cuba.

**AGRA** (ā'gra), a city of India, in the United Provinces, on the right bank of the Jumna, 841 miles by rail from Calcutta. It has various interesting structures, among which are the imperial palace, a mass of buildings erected by several emperors; the Moti Masjid or Pearl Mosque; the mosque called the Jama Masjid (a cenotaph of white marble); and, above all, the Taj Mahal, a mausoleum of the seventeenth century, built by the Emperor Shah Jehan to his favorite queen, of white marble, adorned throughout with exquisite mosaics. Agra has a trade in grain, sugar, etc., and some manufactures, including beautiful inlaid mosaics. It was founded in 1566 by the Emperor Akbar, and was a residence of the following emperors for over a century. Pop. 188,022. The Agra division has an area of 10,139 sq. miles, and a pop. of 5,248,121.

**AGRAM, or ZAGRAB**, a city in the Austrian Empire, capital of the prov. Croatia and Slavonia, near the river Save; contains the residence of the ban or governor of Croatia and Slavonia, government buildings, cathedral (being the see of a Roman Catholic archbishop), university, theater, etc.; carries on an active trade, and manufactures tobacco, leather, and linens. Pop. 61,002.

**AGRARIAN LAWS**, laws enacted in ancient Rome for the division of the public lands, that is, the lands belonging to the state. As the territory of Rome increased the public land increased, the land of conquered peoples being always regarded as the property of the conqueror. The right to the use of this public land belonged originally only to the patricians or ruling class, but latterly the claims of the plebeians on it were also admitted, though they were often unfairly treated in the sharing of it. Hence arose much discontent among the plebeians, and various remedial laws were passed with more or less success. Indeed an equitable adjustment of the land question between the aristocracy and the common people was never attained.

**AGRIC'OLA**, Cneius Julius, lived from A.D. 37 to 93, a Roman consul under the Emperor Vespasian, and governor in Britain, the greater part of which he reduced to the dominion of Rome; distinguished as a statesman and general. His life, written by his son-in-law, the historian Tacitus, gives the best extant account of Britain in the early part of the period of the Roman rule.

**AGRIC'OLA**, Georg, born in Saxony 1490, died at Chemnitz 1555, German physician and mineralogist. Though tinged with the superstitions of his age, he made the first successful attempt to reduce mineralogy to a science, and introduced many improvements in the art of mining.

**AG'RICULTURE** is the art of cultivating the ground, more especially with the plow and in large areas or fields, in order to raise grain and other crops for man and beast; including the art of preparing the soil, sowing and planting seeds, removing the crops, and also the raising and feeding of cattle or other live stock. This art is the basis of all other arts, and in all countries coeval with the first dawn of civilization. At how remote a period it must have been successfully practiced in Egypt, Mesopotamia, and China we have no means of knowing. Egypt was renowned as a corn country in the time of the Jewish patriarchs, who themselves were keepers of flocks and herds rather than tillers of the soil. Naturally little is known of the methods and details of agriculture in early times. Among the ancient Greeks the implements of agriculture were very few and simple. Cato, the censor, who was celebrated as a statesman, orator, and general, derived his highest honors from having written a voluminous work on agriculture.

The Romans introduced their agricultural knowledge among the Britons, and during the most flourishing period of the Roman occupation large quanti-

ties of corn were exported from Britain to the Continent.

The first English treatise on husbandry and the best of the early works on the subject was published in the reign of Henry VIII. (in 1534), by Sir A. Fitzherbert, judge of the Common Pleas.

The American colonists received their agricultural methods from the English, but the United States has, during the last half century, outstripped the world in the art of agriculture. The government has vastly increased the efficiency of the American farmer by the establishment of experiment stations, of which there are now scores supported at a large annual outlay. They employ over 1,000 persons in administration and inquiry, and issue annual reports and bulletins. With few exceptions, they are departments of the agricultural colleges established under the land-grant act (Morrill Act) of 1862, and are independent of each other as regards the planning and conduct of their operations. They are united in a national system through the Association of American Agricultural Colleges and Experiment Stations and the Office of Experiment Stations in the United States Department of Agriculture. This summarizes the accounts of the work of the stations and kindred institutions throughout the world in the periodical known as the Experiment Station Record, and gives popular résumés of their investigations in the Farmers' Bulletins series of the department, under the general title of Experiment Station Work. It also directly manages the stations in Alaska, Hawaii, and Porto Rico.

**AGRIGENTUM** (-jen'tum), an ancient Greek city of Sicily (the modern *Girgenti*), founded about 580 B. C., and long one of the most important places on the island. Extensive ruins of splendid temples and public buildings yet attest its ancient magnificence.

**AG'RIMONY**, a genus of plants, consisting of slender perennial herbs found in temperate regions. Common agrimony, was formerly of much repute as a medicine in England. Its leaves and root-stock are astringent, and the latter yields a yellow dye.

**AGRIP'PA**, Cornelius Henry, born in 1486, at Cologne, he devoted himself to science, and became famous as a magician and alchemist, and was involved in disputes with the church.

**AGRIPPA**, Herod. See Herod Agrippa.

**AGRIPPA**, Marcus Vipsanius, a Roman statesman and general, the son-in-law of Augustus; born B.C. 63, died B.C. 12. He was prætor in B.C. 41; consul in 37, 28, and 27; ædile in 33; and tribune from 18 till his death. He commanded the fleet of Augustus in the battle of Actium. To him Rome is indebted for three of her principal aqueducts, the Pantheon, and several other works of public use and ornament.

**AGRIPPINA**, the name of several Roman ladies: 1. The youngest daughter of Marcus Vipsanius Agrippa, and wife of C. Germanicus; a heroic woman adorned with great virtues. Tiberius, who hated her for her virtues and popularity, banished her to the island of Pandataria, where she starved herself



to death in A.D. 33.—2. A daughter of the last mentioned, and the mother of Nero, by Domitius Ahenobarbus. Her third husband was her uncle, the Emperor Claudius, whom she subsequently poisoned to secure the government of the empire through her son Nero. After ruling a few years in her son's name he became tired of her ascendancy, and caused her to be assassinated (A.D. 60).

**AGROS'TIS**, a genus of grasses, consisting of many species, and valuable as pasture-grasses. The bent-grasses belong to the genus.

**AGUA** (äg'wâ), an active volcano of Central America, in Guatemala, rising to the height of 15,000 feet. It has twice destroyed the old city of Guatemala, in its immediate vicinity.

**AGUARDIENTE** (ä-gwâr-dē-en'te), a popular spirituous beverage of Spain and Portugal, a kind of coarse brandy, made from red wine, from the refuse of the grapes left in the wine-press, etc., generally flavored with anise; also a Mexican alcoholic drink distilled from the fermented juice of the agave.

**AGUAS CALIENTES** (äg'was kâ-lē-en'tās), a town 270 miles n.w. of Mexico, capital of the state of its own name, named from the thermal springs near it; has manufactures of cottons and a considerable trade. Pop. 25,000.

**AGUE** (ä'gū), a kind of fever, which may be followed by serious consequences, but generally is more troublesome than dangerous. According to the length of the interval between one febrile paroxysm and another, agues are denominated quotidian when they occur once in twenty-four hours, tertian when they come on every forty-eight hours, quartan when they visit the patient once in seventy-two hours. Ague arises from marsh miasmata, a temperature above 60° being, however, apparently required to produce it. To cure the disease and prevent the recurrence, quinine and various other bitter and astringent drugs are given with complete success in the majority of cases.

**AGUESSEAU** (ä-ges-ō), Henri François d', a distinguished French jurist and statesman, born at Limoges in 1668; was in 1690 advocate-general at Paris, and at the age of thirty-two procureur-général of the parliament. He risked disgrace with Louis XIV. by successfully opposing the famous papal bull *Unigenitus*. He was made chancellor in 1717. He died in 1751.

**AGUILAR** (a-gi-lär'), Grace, an English writer, born at Hackney 1816, died at Frankfort 1847.

**AGUINALDO** (ä-gē-näl'dō), Emilio, a Filipino chief who led the natives of the Philippine Islands in the insurrections against Spain and the United States. Aguinaldo received a good education from the Dominican friars and was mayor of Cavite Viejo when the insurrection of 1896 broke out. After the defeat of the Spanish power and the sale of the islands to the United States, Aguinaldo held out for the independence of the Filipinos and led the native army against the Americans. He was captured March 23, 1901 by General Frederick Funston and took the oath of allegiance a few days subsequently,

**AGULHAS** (ä-gul'yās), Cape, a promontory, forming the most southern extremity of Africa, about 90 miles southeast of the Cape of Good Hope, rising to 455 feet above the sea, with a lighthouse.

**A'HAB**, the seventh king of Israel succeeded his father Omir 928 B.C., and reigned twenty years. At the instigation of his wife Jezebel he erected a temple to Baal, and became a cruel persecutor of the true prophets. He was killed by an arrow at the siege of Ramoth-Gilead.

**AHASUE'RUS**, in Scripture history, a king of Persia, probably the same as Xerxes, the husband of Esther, to whom the Scriptures ascribe a singular deliverance of the Jews from extirpation.—Ahasuerus is also a Scripture name for Cambyses, the son of Cyrus (Ezra iv. 6), and for Astyages, king of the Medes (Dan. ix. 1).

**A'HAZ**, the twelfth king of Judah, succeeded his father Jotham, 742 B.C. Forsaking the true religion he gave himself up completely to idolatry, and plundered the temple to obtain presents for Tiglath-pileser, king of Assyria.

**AHAZI'AH**: 1. Son of Ahab and Jezebel, and eighth king of Israel, died from a fall through a lattice in his palace at Samaria after reigning two years (B.C. 896, 895).—2. Fifth king of Judah, and nephew of the above. He reigned but one year, and was slain (B.C. 884) by Jehu.

**AHMEDABAD**, or **AHMADABAD** (ä-mad-ä-bäd), a town of India, presidency of Bombay, in district of its own name, on the left bank of the Sabarmati, 310 miles north of Bombay. Pop. 185,889.—Area of dist. 3949 sq. m.; pop. 795,094.

**AHMEDNAG'AR**, a town of India, presidency of Bombay, in district of its own name, of commonplace appearance, surrounded by an earthen wall. Pop. (including military), 42,032.—Area of dist. 6645 sq. m.; pop. 837,774.

**AHMED SHAH**, born 1724, died 1773, founder of the Durâni dynasty in Afghanistan. On the assassination of Nadir he proclaimed himself shah, and set about subduing the provinces surrounding his realm. Among his first acts was the securing of the famed Koh-i-noor diamond, which had fallen into the hands of his predecessor. He crossed the Indus in 1748, and his conquests in northern India culminated in the defeat of the Mahrattas at Panipat (6th Jan. 1761). Affairs in his own country necessitated his withdrawal from India, but he extended his empire vastly in other directions far beyond the limits of modern Afghanistan. He was succeeded by his son Timur.

**AID**, a subsidy paid in ancient feudal times by vassals to their lords on certain occasions, the chief of which were: when their lord was taken prisoner and required to be ransomed, when his eldest son was to be made a knight, and when his eldest daughter was to be married and required a dowry. From the Norman Conquest to the fourteenth century the collecting of aids by the crown was one of the forms of taxation, being latterly regulated by parliament.

**AIDE-DE-CAMP** (äd-dé-kän), a military officer who conveys the orders of a general to the various divisions of the army on the field of battle, and at other times acts as his secretary and general confidential agent.

**AIDIN** (ä-i-dēn'), or **GUZEL HISSAR**, a town in Asiatic Turkey, about 60 miles southeast of Smyrna. Pop. 35,000.

**AIGRETTE**, a term used to denote the feathery crown attached to the seeds of various plants, such as the thistle, dandelion, etc.—It is also applied to any head-dress in the form of a plume, whether composed of feathers, flowers, or precious stones.

**AI'KIN**, John, M.D., an English miscellaneous writer, born 1747, died 1822. His General Biographical Dictionary was begun in 1799 and finished in 1815. He was editor of the Monthly Magazine from 1796 till 1806.

**AI'KIN**, Lucy, daughter of the preceding, was born in 1781, and died 1864. In 1818 appeared her *Memoirs of the Court of Queen Elizabeth*, a very popular work. She afterward produced similar works on the reigns of James I. (1822) and Charles I. (1833), and a *Life of Addison* (1843).

**AILAN'TO**, *Ailanthus*, a large and handsome tree, with pinnate leaves one or two feet long, is a native of China, but has been introduced into Europe and North America, where it is in favor for its elegant foliage. A species of silkworm, the *ailanthus silkworm* feeds on its leaves, and the material produced, though wanting the fineness and gloss of mulberry silk, is produced at less cost, and is more durable. The wood is hard, heavy, glossy, and susceptible of a fine polish.

**AIN** (an), a southeastern frontier department of France, mountainous in the east (ridges of the Jura), flat or undulating in the west, divided into two nearly equal parts by the river Ain, a tributary of the Rhone; area, 2239 square miles. Capital, Bourg. Pop. 364,408.

**AINMILLER** (in'mil-er), Max Emanuel, a German artist who may be regarded as the restorer of the art of glass-painting; born 1807, died 1870. As inspector of the state institute of glass-painting at Munich he raised this art to a high degree of perfection by the new or improved processes introduced by him.

**AINOS** (i'nōz), the native name of an uncivilized race of people inhabiting the Japanese island of Yesso, as also Saghalien, and the Kurile Islands, and believed to be the aboriginal inhabitants of Japan. They do not average over 5 feet in height, but are strong and active. They are very hairy, wear matted beards, and have black hair which they allow to grow till it falls over their shoulders. Their complexion is dark brown, approaching to black. They worship the sun and moon, and pay reverence to the bear. They support themselves by hunting and fishing.

**AINSWORTH**, William Harrison, an English novelist; born 1805, died 1882. He was the son of a Manchester solicitor and intended for the profession of law, but devoted himself to literature. He wrote *Rookwood* (1834), *Jack Sheppard*



(1839), and about forty other novels, including Guy Fawkes, Tower of London, Windsor Castle, Lancashire Witches, Flicht of Bacon, etc.

**AIR**, the gaseous substance of which our atmosphere consists, being a mechanical mixture of 79.19 per cent by measure of nitrogen and 20.81 per cent of oxygen. The latter is absolutely essential to animal life, while the purpose chiefly served by the nitrogen appears to be to dilute the oxygen. Oxygen is more soluble in water than nitrogen, and hence the air dissolved in water contains about 10 per cent more oxygen than atmospheric air. The oxygen therefore available for those animals which breathe by gills is somewhat less diluted with nitrogen, but it is very much diluted with water. For the various properties and phenomena connected with air see such articles as Atmosphere, Airpump, Barometer, Combustion, Respiration, etc.

**AIR**, in music, a continuous melody, in which some lyric subject or passion is expressed. The lyric melody of a single voice, accompanied by instruments, is its proper form of composition. Thus we find it in the higher order of musical works; as in cantatas, oratorios, operas, and also independently in concertos.—Air is also the name often given to the upper or most prominent part in a concerted piece, and is thus equivalent to treble, soprano, etc.

**AIR BEDS AND CUSHIONS**, often used by the sick and invalids, are composed of india-rubber or of cloth made air-tight by a solution of india-rubber, and when required for use filled with air, which thus supplies the place of the usual stuffing materials. They tend to prevent bed-sores from continuous lying in one position. They are also cheap and easily transported, as the bed or cushion, when not in use, can be packed in small compass, to be again inflated with air when wanted.

**AIR-BLADDER**. See Swimming-bladder.

**AIR-BRAKE**, an American invention used on railroads in the United States. It consists of an automatic device by which air, stored on the train, is applied to the work of pressing the brake on all wheels. The air-brake was invented in 1869 by George Westinghouse, Jr., who has improved it to a high state of perfection. The very high passenger train speeds of recent years led Mr. Westinghouse, in 1897, to place on the market a high-speed brake. This brake is designed to use very high air-pressure when the brake is applied with the train at full speed, which pressure is gradually reduced by an automatic reducing valve on the brake cylinder as the speed diminishes. This brake has not been extensively used. Tests made with the regular high-speed brake attached to a fifty-car train showed the following among other results: Emergency stop of train running at 40 miles per hour made in about 675 feet, in 20 seconds; breaking the train in two at a speed of from 20 to 25 miles per hour, the two sections stopped at distances of from 32 feet to 180 feet apart; applying brakes with train standing to show rapidity of action, all brakes applied within

two seconds; comparison of emergency air-brake stop and hand-brake stop at 20 miles per hour: air-brake stop in 158 to 194 feet, hand-brake stop in 1000 feet to 1720 feet; service stop test to determine time of release of brakes, all brakes released in four seconds. Several forms of air-brake besides the Westinghouse have been employed to some extent in America, but they are exactly similar in their principles of operation.

**AIR-CELLS**, cavities in the cellular tissue of the stems and leaves of plants which contain air only, the juices of the plants being contained in separate vessels. They are largest and most numerous in aquatic plants, the gigantic leaves of which are buoyed up on the surface of the water by their means.—The minute cells in the lungs of animals are also called air-cells. There are also air-cells in the bodies of birds. They are connected with the respiratory system, and are situated in the cavity of the thorax and abdomen, and sometimes extend into the bones. They are most fully developed in birds of powerful and rapid flight, such as the albatross.

**AIR-ENGINE**, an engine in which air heated, and so expanded, or compressed air is used as the motive power. A great many engines of the former kind have been invented, some of which have been found to work pretty well where no great power is required. They may be said to be essentially similar in construction to the steam-engine, though of course the expansibility of air by heat is small compared with the expansion that takes place when water is converted into steam. Engines working by compressed air have been found very useful in mining, tunneling, etc., and the compressed air may be conveyed to its destination by means of pipes. In such cases the waste air serves for ventilation and for reducing the oppressive heat.

**AIR-GUN**, an instrument for the projection of bullets by means of condensed air, generally either in the form of an ordinary gun, or of a pretty stout walking-stick, and about the same length. A quantity of air being compressed into the air-chamber by means of a condensing syringe, the bullet is put in its place in front of this chamber, and is propelled by the expansive force of a certain quantity of the compressed air, which is liberated on pressing the trigger.

**AIR-PLANTS**, or **EPIPHYTES**, are plants that grow upon other plants or trees, apparently without receiving any nutriment otherwise than from the air. The name is restricted to flowering plants (mosses or lichens being excluded) and is suitably applied to many species of orchids. The conditions necessary to the growth of such plants are excessive heat and moisture, and hence their chief localities are the damp and shady tropical forests of Africa, Asia, and America. They are particularly abundant in Java and tropical America.

**AIR-PUMP**, an apparatus by means of which air or other gas may be removed from an inclosed space; or for compressing air within an inclosed space. An ordinary suction-pump for water is on the same principle as the air-pump; indeed, before water reaches

the top of the pipe the air has been pumped out by the same machinery which pumps the water. An ordinary suction-pump consists essentially of a cylinder or barrel, having a valve open-

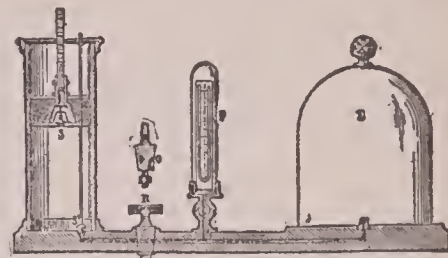


Fig. 1. air-pump (sectional view).

ing from the pipe through which water is to rise and a valve opening into the outlet pipe, and a piston fitted to work in the cylinder (the outlet valve may be in the piston). (See Pump.) The arrangement of parts in an air-pump is quite similar. The barrel of an air-pump fills with the air which expands from the receiver (that is, the vessel from which the air is being pumped), and consequently the quantity of air expelled at each stroke is less as the exhaustion proceeds, the air getting more and more rarefied. Suppose that the receiver (so called because it receives objects to be experimented on) is exactly as large as the barrel; by the first stroke there is just half the air removed, by the second there is one-fourth, by the third there is an eighth, and so on. Suppose the barrel is  $\frac{1}{2}$  of the receiver as to volume. On raising the piston the air which filled the receiver now fills both barrel and receiver, so that  $\frac{1}{2}$  is removed at the first stroke,  $\frac{1}{4}$  of the remaining  $\frac{1}{2}$  is removed at the second stroke—that is  $\frac{1}{8}$ , and  $\frac{1}{4}$  of  $\frac{1}{8}$  at the third stroke, and so on. Fig. 1 represents the essential parts of a good air-pump in section. E is the receiver, F is a mercurial pressure-gauge, which indicates the extent of exhaustion; R is a cock by means of which air may be readmitted to the receiver or by means of which the receiver may be shut off from the pump-

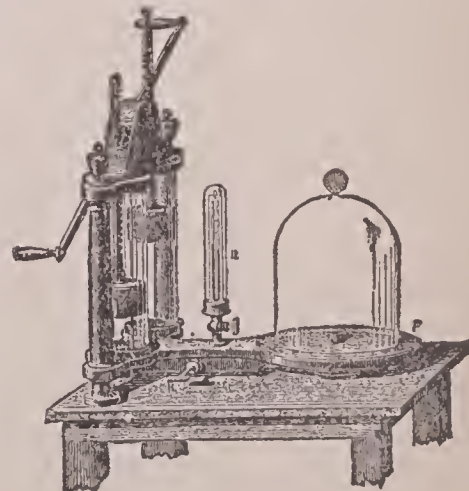


Fig. 2. air-pump.

barrel. s is the inlet valve of the barrel; and, inasmuch as the tension of the air in the receiver after some strokes would not be sufficient to lift a valve, this valve is opened by means of the rod



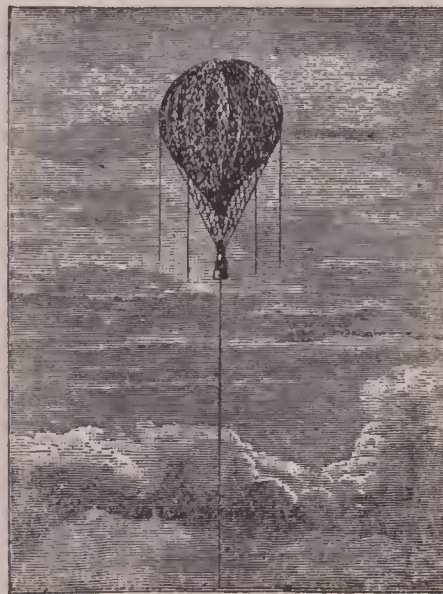
which passes up through the piston. The outlet valve *s* is kept down by a light spiral spring; it opens when, on the space diminishing in the barrel by the descent of the piston, the contained air has a sufficient pressure. Fig. 2 shows a similar pump in perspective (a double-barreled pump); *p* is the plate on which the receiver is placed, *h* the pressure-gauge, *r* the readmission cock. The pressure-gauge is merely a siphon barometer inclosed in a bell-shaped vessel of glass communicating with the receiver. This barometer consists of a bent tube containing mercury, one end being closed, the other open. As the air is exhausted the smaller is the difference between the height of the mercury in the two branches of the tube, and a complete vacuum would be indicated if the mercury stood at the same level in both. —Air-pumps for compressing air are constructed on the same principle but act the reverse way.—Many interesting experiments may be made with the air-pump. If an animal is placed beneath the receiver, and the air exhausted, it dies almost immediately; a lighted candle under the exhausted receiver immediately goes out. Air is thus shown to be necessary to animal life and to combustion. A bell, suspended from a silken thread beneath the exhausted receiver, on being struck cannot be heard. If the bell be in one receiver from which the air is not exhausted, but which is within an exhausted receiver, it still cannot be heard. Air is therefore necessary to the production and to the transmission of sound. A shriveled apple placed beneath an exhausted receiver becomes as plump as if quite fresh, being thus shown to be full of elastic air. The air-pump was invented by Otto von Guericke, burgomaster of Magdeburg, about the year 1654.

**AIRSHIP AND FLYING MACHINE,** vehicles for navigating the atmospheric air, the first being buoyed up by balloons filled with gas, hydrogen preferably; the second being constructed on the principles of a bird's wing. The earliest successful balloon was that made by the brothers Etienne and Joseph Montgolfier, in France, who in 1782 succeeded in causing a silk bag of 50 cubic feet to rise to the ceiling of a room, and in 1783, in the presence of an immense crowd, a balloon 35 feet in diameter rose to a height of 1500 feet. All successful attempts at aerial navigation until 1907-8 were balloons. The gases employed being either hydrogen or ordinary coal gas. The former when pure is between 14 and 15 times lighter than atmospheric air and the latter generally about 2.1-2 times lighter. According to the principles of Archimedes bodies immersed in a fluid are buoyed upwards with a force equivalent to the weight of the fluid displaced by them. If their own weight is not sufficient to counterbalance this force, that is if they are lighter than this fluid they rise upward with a force equal to the difference between the weight of the displaced fluid and their own weight. Thus the balloon rises in the air in the same way that a cork rises in the water. Thus for instance if a balloon occupies as much space as 1000 pounds of air, but weighs

itself 600 pounds, it will be impelled upwards with a force of 400 pounds.

Balloons are made of silk or cotton, the pieces sewn together and all of it varnished to prevent the escape of gas. A network of cord extends over the varnished cloth supporting a hoop from which a car is suspended by 6 or more strong ropes about 4 feet long. Inside the car are sand bags for ballast and the grappling iron tied to the end of a long rope for anchoring the balloon at the end of the descent. At the top of the balloon there is a valve made of wood from one to three feet in diameter. This is kept closed by a spring but is opened or closed by a rope running down into the car. When the balloonist wishes to ascend he throws some of the ballast over the side of the car. If he wishes to descend he opens the valve and the place of the escaping gas is taken by air whose heavier weight increases the weight of the balloon. Later balloons have been provided with steering apparatus by which the direction of their flight can be regulated at will and not be left to wind.

It is said that as early as 1306 successful balloon ascents were made by the



Balloon above the clouds.

Chinese, but the first European balloonist was Guszman who made the ascent at Lisbon in 1709, using heated air. The first hydrogen balloon was made by Black of Edinburg in 1767. Various experiments were made in Paris by the Mongolfiers, and in May, 1783, a balloon was sent up 100 ft. carrying a cage with a sheep, a cock and a duck. These were the first aerial travellers. Nov. 21, 1783, Pilatre des Rosiers with the Marquis d'Arlands were the first human passengers in a balloon, remaining in the air 25 minutes.

The highest balloon ascent recorded was one of seven miles made from Wolverhampton, Eng. Sept. 5, 1862, by Glazier and Coxwell. At this great height the cold was intense, the thermometer standing at 12 F. The barometer fell 7 inches, as compared with 29 at the surface of the earth. When the balloon was 29,000 feet high, Glaisher

became insensible, and remained so for seven minutes. Coxwell at this height had mounted into the ring to adjust the valve-line, when his hands became frozen, and he had to open the valve by seizing the line with his teeth. He too was nearly insensible. Up to the height of 5 miles the aeronauts experienced no difficulty in breathing, except when some exertion was made. Perfect stillness and silence reigns six miles above the earth but a railway train in motion can be heard at a height of 4 miles.

The development of the balloon has been chiefly for its utilization in war. Balloon corps are attached to the armies of the leading nations. They were first used in France in 1794 for the purpose of observing the enemy. During the siege of Paris, 1870-71, the balloon was extensively employed. For military purposes attempts have been made to construct dirigible balloons. The first notable dirigible flight was that of Renaud in 1884 when in a cigar shaped balloon with a powerful motor and a front screw he traversed an oblong course of 5 miles in 23 minutes. Notable successes in dirigible balloons have been since achieved by Santos Dumont, Count de la Vaux, Count Almirigo and Lebaudy,—the latter made a successful flight of more than 80 miles in 1906. At the race of the American Federation of Aero Clubs, held at Chicago, July 4, '08, Dr. F. D. Fielding's balloon, traveled 895 miles, landing at West Shefford, Quebec.

Attempts to imitate the flight of birds by mechanical contrivances antedate the balloon by several hundred years. The first properly authenticated account of an artificial wing was given by Borelli in 1670, and his investigations and experiments furnished the principal basis for experiments until 1867. In this year Professor J. B. Pettigrew, an English scientist, published the results of an elaborate and careful series of studies made by him upon the flight of birds, which wrought a revolution in the construction of flying machines. For thirty years, however, inventors struggled without absolute success.

The first aeroplane types of flying machines were designed by Maxim and Langley in 1891 to '96. The work of inventors and scientists along the line of motor-driven, flying machines has shown steady progress. The motors have been made stronger and lighter, problems of rising and alighting safely solved, and additional scientific knowledge of aerial conditions has been gained. The general and most popular design is that of the simple aeroplane, supported by air, through which it is propelled by detached force. There were many experiments along these lines and those of 1907 were notable, but not until 1908 could it be fairly said that the flying by means of machines heavier than the atmosphere had become an accomplished fact. The experiments in that direction in former years were completely eclipsed in 1908 by Wilbur and Orville Wright, Henry Farman, and Leon Delagrangé and others working on both sides of the Atlantic. For a time France appeared to lead in aviation, but that was because the Americans worked more



# AIRSHIPS AND AEROPLANES.



1. Count Zeppelin and his airship above the town of Zurich. Photographed in mid air

2. A school at which men are taught to fly

3. A scene aboard a flying machine

4. Wilbur Wright flying at dusk on the occasion of his great flight in 1908.

5. Wilbur Wright takes the first woman to fly, as a passenger

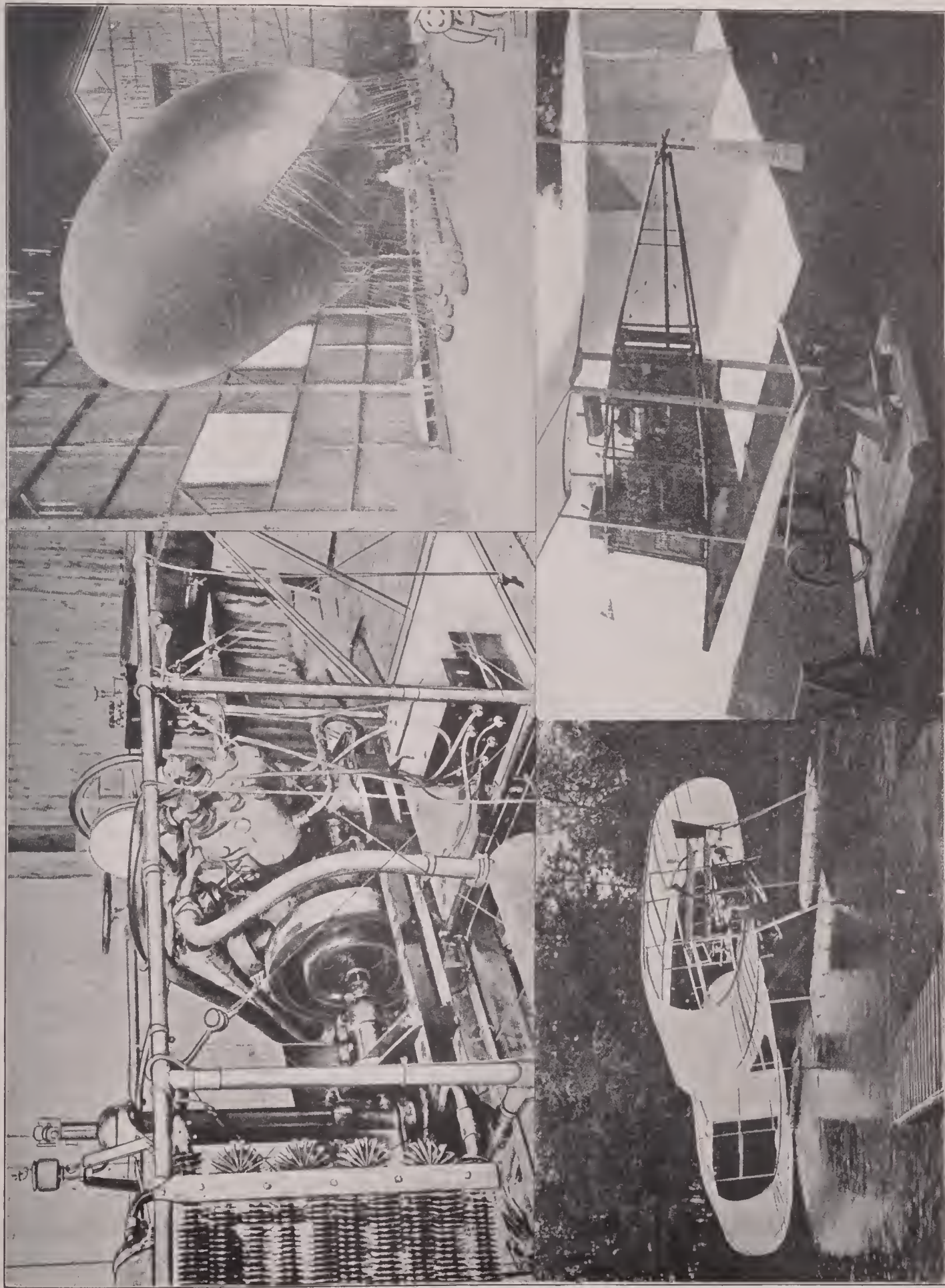
6. The first exhibition of aeroplanes and airships ever held

7. Orville and Wilbur Wright and their famous aeroplane









1. Four-cylinder gasoline motor, 16 h.p., for (2.) Count de la Vaulx's airship. 3. Bleriot's aeroplane, ready for flight. 4. Motor and propeller of Santos-Dumont's aeroplane.







or less in secret while the exploits of the Frenchmen were widely advertised. At the close of the year it was generally acknowledged that the Wright brothers of Dayton, O., were far in the lead of all the rest.

In 1907 and the preceding two or three years, considerable progress was made in the direction of constructing dirigible balloons, and one of the most successful types of these was the Zeppelin airship in Germany. This was further developed in 1908, and all records for performances by craft in which gas is the sustaining power were broken. The most remarkable was that in which the airship was destroyed. Count Zeppelin started from the waters of Lake Constance at 6:15 a. m. Aug. 4, in an attempt to make the longest flight on record for a dirigible balloon. He passed over the city of Constance and kept to the west until Basel, on the Swiss frontier, was passed. Then he sailed north-west to Mulhausen and thence northeasterly along the Rhine valley, passing over Strassburg and other cities and continuing until 6 o'clock in the evening when a landing was made on an island in the Rhine, near Oppenheim, Germany. One of the motors was out of order and a stop had to be made for repairs. At 10:15 p. m. the flight was resumed until Mayence was reached. After encircling the city the airship was turned in the direction of home. All went well until Echterdingen, five miles south of Stuttgart, was reached, about 8 a. m. on the 5th. Here it became necessary to make another descent owing to the fusing of the metal in which the piston of the forward motor ran and also because of the escape of gas caused by an ascent of 6,000 feet in the air while maneuvering. The landing was safely made and the necessary repairs were being made when at 3 o'clock in the afternoon a storm, arose, tore the balloon from its moorings and drove it some fifty yards. Here the rear end of the fabric drooped and in a moment smoke and flames were seen to burst out from one end to the other, followed almost immediately by an explosion which brought the motors and framework crashing to the ground. Four of the crew were injured, but Count Zeppelin escaped being hurt. The craft, which was the fourth constructed by Count Zeppelin, was completely destroyed. It was 443 feet long with a diameter of about 45 feet. The balloon part was separated into sixteen separate interior compartments for the inflating gas. The bow tapered to a blunt point, while at the stern were the rudders and frames used in steering. Underneath were suspended two independent platforms, each carrying a motor capable of developing 140 horse power. The outer part of the airship consisted of a rigid envelope of aluminum, this among other things making it distinct from any other craft of the kind constructed. It had made many successful trips in the vicinity of Lake Constance and had carried as many as sixteen passengers at one time.

The other dirigible airships of the balloon type that attracted attention in 1908 were the Parseval in Germany, the Republic (La Republique) in France

and the Baldwin in the United States. These, though differing in detail, are similar in principle, the lifting power in each being a balloon of the usual materials and the motive power a gas engine working in a suspended frame. The Parseval, named after its inventor, Major Von Parseval, made a trip from Berlin, Sept. 15, lasting 11 hours and 15 minutes, at a height of about 1,500 feet and at a speed of about 25 miles an hour. The balloon is 157 feet long and 26 feet in diameter, and its gas capacity is 3,270 cubic yards. It is tube-shaped with rounded ends. The car, which is about 20 feet in length, is suspended so as to swing backward and forward in its plane parallel to the gas bag, not being rigidly fastened to it. The propeller, 14 feet in diameter, is situated just above the car.

The dirigible balloon made by Capt. Thomas A. Baldwin, and accepted by the war department of the United States, is 84 feet long, with a maximum diameter of 18 feet and a minimum diameter of 16 feet, and a capacity of 18,000 cubic feet of gas. The suspended frame is 66 feet in length and the 12 foot propeller makes 450 revolutions per minute, driving the airship at the rate of about 20 miles an hour. The engine is of twenty horse-power. The ship is raised or lowered by means of box-kite planes at the forward end.

The Wright aeroplane, which won the honors of the year both in Europe and America, is what is called a biplane, the surfaces of which are parallel, exactly one above the other and slightly concave on the lower surface. They are made of cloth stretched on a framework of spruce. They are 40 feet long and 6½ feet wide, giving a total area of 260 square feet. The distance between the planes is 6 feet. In front is a horizontal biplane rudder for regulating the height of flight, at the back a vertical biplane rudder for steering. The total length of the machine is 33 feet. Between the planes is a four-cylinder water-cooled twenty-five horse-power motor, designed by the Wright brothers. On its right is a radiator with flat copper tubes and on its left sit the pilot and passenger. The motor drives two wooden propellers 10 feet in diameter by means of crossed chains. The propellers revolve in opposite directions and are geared down in the ratio of 33 to 9. The total weight of the aeroplane with one man on board is about 1,000 pounds. The motor in working order weighs 200 pounds.

The method of operation is apparently very simple. The most interesting feature consists in the "working" of the extreme under part of the wings, whereby the flight of a bird is imitated and perfect lateral stability is secured. The rudder which regulates the horizontal balance has to be used almost continually. In order to make a flight a wooden rail about 72 feet long is laid on the ground. The aeroplane rests upon wooden "skates" and has two rollers in front. On the rail runs a little car upon which the aeroplane rests and the rollers on the rail. When the screws begin to revolve the machine

flies rapidly along the rail and at its extremity rises into the air by the help of the horizontal rudder. When there is a wind the rail alone is sufficient. In calm weather the aeroplane is launched as by a catapult, by means of a weight of 1,500 pounds, which falls from the top of a pillar 18 feet high and pulls upon ropes passing through pulleys.

The French rights in the Wright patents were sold in October, 1908, to a syndicate headed by Lazare Weiller for \$100,000. The tests in France were made in the vicinity of Le Mans by Wilbur Wright, while those in the United States by Orville Wright took place at Fort Myer, Va., under the supervision of army officers.

Next after the Wright aeroplane, that invented by Henry Farman of Paris was the most successful, with that constructed by Leon Delagrange, also of Paris, a close third. The Farman machine consists of two superimposed aero surfaces, each about 33 feet long by 6½ feet wide and set 5 feet apart. The framework of the ship is of wood and steel tubing, and the covering of the aerosurfaces rubber. The body for carrying motor and other machinery and the aeronaut is covered with canvas and is 15 feet long, 2½ feet wide. The motor is of the petrol Antoinette type and the propeller, which is 7½ feet in diameter, is of aluminum sheeting. It makes 1,050 revolutions per minute. The machine is mounted on bicycle wheels and starts by running along the ground under its own power until lifted by the planes. In alighting the power is simply shut off and the machine allowed to glide toward the ground. The whole contrivance weighs about 1,600 pounds. The Delagrange aeroplane is similar in most respects to the Farman machine, the latter being practically only an improved model of the former.

#### AEROPLANE RECORDS

Sept 12, 1908—Orville Wright remained in air 74 minutes 24 seconds at Fort Myer, Va.; also remained in air 9 minutes 6½ seconds with one passenger accompanying him; distance 5.88 miles.

Sept. 16, 1908—Wilbur Wright, 26 miles, in 39 minutes 18½ seconds, at Le Mans, France.

Sept. 17, 1908—Orville Wright badly injured and Lieut. Thomas E. Selfridge killed in aeroplane accident at Fort Myer, Va.

Sept. 21, 1908—Wilbur Wright, about 61 miles, in 1 hour 31 minutes 51 seconds, at Le Mans, France; eclipsing all previous records.

Oct. 2, 1908—Henry Farman, 40 kilometers, in 44 minutes 32 seconds at Paris, France; claimed as speed record.

Oct. 6, 1908—Wilbur Wright, with passenger, remains in air 1 hour 4 minutes 26 seconds, at Le Mans, France.

Oct 30, 1908—Henry Farman flies from Mourmelon to Rheims, in France, 20 miles in 20 minutes, at height of 120 to 150 feet.

December 31, 1908—Wilbur Wright breaks all previous aeroplane records at Le Mans, France, with a flight of



two hours and nine minutes, thereby winning the Michelin cup.

**AIRY**, Sir George Biddell, a distinguished English astronomer, was born at Alnwick, June 27, 1801, and educated at Hereford, Colchester, and Trinity College, Cambridge. In 1835 he was appointed astronomer-royal, and as such his superintendence of the observatory at Greenwich was able and successful. Among separate works published by him may be mentioned *Popular Astronomy*, *On Sound and Atmospheric Vibrations*, *A Treatise on Magnetism*, *On the Undulatory Theory of Optics*, *On Gravitation*. Died Jan. 2, 1892.

**AISLE** (il), in architecture, one of the lateral divisions of a church in the direction of its length, separated from the central portion or nave by piers or pillars. There may be one aisle or more on each side of the nave. The cathedrals at Antwerp and Paris have seven aisles in all. The nave is sometimes called the central aisle. See Cathedral.

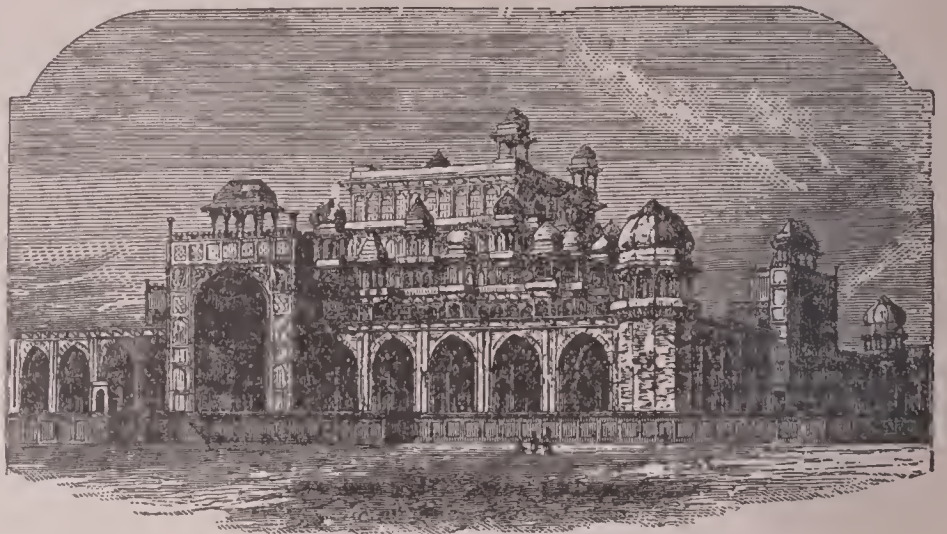
**AISNE** (ān), a northeastern frontier department of France; area, 2838 sq. miles. It is an undulating, well-cultivated, and well-wooded region, chiefly watered by the Oise in the north, its tributary the Aisne in the center, and the Marne in the south. It contains the important towns of St. Quentin, Laon (the capital), Soissons, and Chateau Thierry. Pop. 555,925.

**AIVA'LI**, or **KIDONIA**, a seaport of Asiatic Turkey, on the Gulf of Adramyti, 66 miles north by west of Smyrna, carrying on an extensive commerce in olive-oil, soap, cotton, etc. Pop. 30,000.

**AIX-LA-CHAPELLE** (āks-lā-shā-pel), a city of Rhenish Prussia, 38 miles west by south of Cologne. The most important building is the cathedral, the oldest portion of which, often called the nave, was erected in the time of Charles the Great (Charlemagne) as the palace chapel about 796. Aix-la-Chapelle, with the adjoining Burtscheid, which may be considered a suburb, is a place of great commerce and manufacturing industry, the chief productions being woolen yarns and cloths, needles, machinery, cards (for the woolen manufacture), railway and other carriages, cigars, chemicals, silk goods, hosiery, glass, soap, etc. A considerable portion of its importance and prosperity arises from the influx of visitors to its springs and baths, there being a number of warm sulphur springs here, and several chalybeate springs, with ample accommodation for strangers. Thirty-seven German emperors and eleven empresses have been crowned in it, and the imperial insignia were preserved here till 1795, when they were carried to Vienna. Pop. 135,245.—Congress of Aix-la-Chapelle, a congress held in 1818, by which the army of the allies in France was withdrawn after France had paid the contribution imposed at the peace of 1815, and independence restored to France.—A treaty of peace concluded at this city, May 2, 1668, as a result of the Triple Alliance, put an end to the war carried on against Spain by Louis XIV. in 1667, after the death of his father-in-law Philip IV., in support of his claims to a great part of the

Spanish Netherlands, which he urged in the name of his queen, the infanta Maria Theresa. By this France obtained Lille, Charleroi, Douai, Tournai, Oudenarde, etc. The second peace of

but took the chief power into his own hands in 1560. He fought with distinguished valor against his foreign foes and rebellious subjects, conquering all his enemies, and extending the limits



Tomb of Akbar.

Aix-la-Chapelle, October 18, 1748, terminated the Austrian war of succession.

**AJACCIO** (ä-yäch'ō), the capital of Corsica, on the southwest coast of the island, on a tongue of land projecting into the Gulf of Ajaccio, the birthplace of Napoleon and the seat of a bishop, with coral and sardine fisheries, and a considerable trade. Pop. 20,946.

**A'JAX**, the name of two Grecian chiefs who fought against Troy, the one being son of Oileus, the other son of Telamon. The latter was from Salamis, and sailed with twelve ships to Troy, where he is represented by Homer as the boldest and handsomest of the Greeks, after Achilles. On the death of Achilles, when his arms, which Ajax claimed, were awarded to Ulysses, he became insane and killed himself. This is the subject of Sophocles's tragedy *Ajax*.

**AJMEER'**, **AJMIR**, or **AJMER**, a British commissionership in India, Rajputana, divided into the two districts of Ajmeer and Mairwara; area, 2711 sq. miles. Pop. 476,912.—Ajmeer, the capital, an ancient city, a favorite residence of the Mogul emperors, is 279 miles s.w. of Delhi, at the foot of Taragarh Hill (2853 feet), on which is a fort. Pop. 73,839.

**AJOWAN'**, an umbelliferous plant cultivated in India, Persia, and Egypt, the seeds of which are used in cookery and in medicine, having carminative properties.

**AJ'UTAGE**, a short tube of a tapering shape fitting into the side of a reservoir to regulate the discharge of the water. Also, the nozzle of a tube for regulating the discharge of water to form a jet d'eau.

**AKAROID RESIN**, a resin obtained from some of the grass-trees of Australia, used in varnishes.

**AK'BAR**, a Mogul emperor, the greatest Asiatic prince of modern times. He was born at Amerkote, in Sind, in 1542, succeeded his father, Humayun, at the age of thirteen, and governed first under the guardianship of his minister, Beyram,

of the empire farther than they had ever been before, although on his accession they embraced only a small part of the former Mogul Empire. He died in 1605. His mausoleum at Secundra, near Agra, is a fine example of Mohammedan architecture.

**AKEE'**, a tree much esteemed for its fruit. The leaves are somewhat similar to those of the ash; the flowers are small and white, and produced in branched spikes. The fruit is lobed and ribbed, of a dull orange color, and contains several large black seeds, embedded in a succulent and slightly bitter arillus of a pale straw color, which is eaten when cooked. The akee is a native of Guinea, whence it was carried to the West Indies by Captain Bligh in 1793.

**A KEMPIS**, Thomas. See Thomas à Kempis.

**AKHUND OF SWAT**, The, a noted Mohammedan dervish and saint who exerted a considerable influence on the Ameer of Afghanistan during the Turko-Russian war of 1877. The akhund caused no end of anxiety to the



Akka-African tribe.

British government, although he was generally friendly to that power. He died in 1878.

**AKKAS**, a dwarfish race of central Africa, dwelling in scattered settlements to the northwest of Lake Albert



Nyanza, about lat. 3° n., lon. 29° e. Their height averages about 4½ feet; they are of a brownish or coffee color; head large, jaws projecting (or prognathous), ears large, hands small. They are timid and suspicious, and live almost entirely by the chase, being exceedingly skilful with the bow and arrow.

**AKMOLINSK'**, a Russian province in central Asia, largely consisting of steppes and wastes. Capital, Omsk. Area about 210,000 sq. m. Pop. 678,957.

**AK'RON**, a town of the United States, in Ohio, 100 miles n.e. of Columbus, on an elevated site. Being furnished with ample water-power by the Little Cuyahoga, it possesses large flour-mills, woolen factories, manufactures of iron goods, etc. In the vicinity extensive beds of mineral paint are worked. Pop. 45,000.

**AKSU**, a town of Chinese Turkestan, 260 miles northeast of Yarkand at the southern base of the Thian-shan mountains. It was formerly the capital of a separate khanate; in 1867 it became a part of the state of Eastern Turkestan under Yakub Beg, but was conquered again by China in 1867. It is celebrated for its manufactures of cotton cloth and saddlery, and is much resorted to by caravans as a entrepot of commerce between Russia Tartary and China.

**AKYAB**, a town of Burmah, the chief seaport of Aracan, is situated on the eastern side of the island of the same name at the mouth of the Kulaban river 190 miles east of Calcutta. In 1826, being then a mere fishing village, it was chosen for the chief station of the province and now is a great rice port, a well built place with broad and regular streets, good public buildings and a high school. Savage island with a light house, shelters the harbor. Pop. 40,000. Island of the same name has population of 450,000.



**ALABAMA** (al-a-bá'ma), a Gulf State bounded on the north by Tennessee, on the south by Florida and the Gulf of Mexico, on the east by Georgia, and on the west by Mississippi. Its length is 330 miles, average breadth 154, and area 50,722 square miles. It ranks twenty-seventh in size among the states. The Alleghany range stretches into the northern portion of the state, but the elevation is nowhere great. The Alabama is the chief river of the state. It is formed by the junction of the Coosa and

the Talapoosa, which unite about 10 miles above the city of Montgomery. Forty-five miles above Mobile the Alabama is joined by the Tombigbee, and from that point is known as the Mobile River. It is navigable from Mobile to Wetumpka, on the Coosa, some 460 miles. The Tombigbee is navigable to Columbus, and the Black Warrior, one of its chief tributaries, to Tuscaloosa. The Tennessee flows through the northern portion of the state, and the Chattahoochee forms part of its eastern boundary. The climate of Alabama is semi-tropical. The temperature ranges from 82° to 18° Fahr. in winter, and in summer from 105° to 60°; the mean temperature for the year being a little over 60°.

Alabama possesses a rich soil of varied character, and produces corn and cotton in abundance. Wheat, oats and hay also form important articles of agricultural production. The State is heavily timbered, especially in the southern tier of counties.

Shipments of cotton are made from Mobile, and through Savannah, Ga., New Orleans and Charleston, S. C. Rice and sugar cane, sweet potatoes, and all kinds of vegetables and fruits are abundant, and some tobacco is grown in the north. There is an abundant rainfall, aggregating fifty to fifty-four inches per annum, and well distributed throughout the seasons. Much attention is given to stock-raising.

The abundant mineral resources of Alabama have been developed wonderfully during the last decade. Coal is found in vast deposits, side by side with beds of limestone and iron ore of enormous extent. In the valleys of the Tennessee and upper Alabama rivers, the enterprising cities BIRMINGHAM, BESSEMER, Sheffield, Roanoke, Huntsville, Decatur and others rank with the most energetic mining and manufacturing cities of the North. It is claimed that pig iron can be manufactured more cheaply in Alabama than anywhere else in the Union. There are large manufactures of cotton goods, and many varied industries have been introduced. The railway system has been rapidly extended since the war. In 1907 there were 2,985 miles of completed railroad.

The population of Alabama, 1,262,505 in 1880, increased 19.4 per cent. during the decade, and the census of 1890 returns it at 1,513,107. It is now, 1909, estimated by the Governor of the state to be 2,100,000. There are over half a million colored people in the State. The chief towns are MONTGOMERY, the capital, Mobile, Birmingham, Bessemer, Anniston, and Huntsville. Mobile is the only seaport.

There is a good school system, supplemented by State-aided universities, and normal and training schools. In the larger cities there are separate school districts.

Alabama was first visited by De Soto in 1540, and takes its name from the very powerful nation of Indians that were at that time found occupying it. Among these were the Alibamas, the Choctaws, the Chickasaws, the Cherokees, and the Apalaches. In 1702 the French settled at Biloxi, founded Mobile in 1711, and for many years were discouraged by

disease and famine. In 1763 Alabama was added to Illinois territory and passed through various vicissitudes of Indian wars, claims from different countries and neighboring states, until in 1817 it was formed into a territory and two years later admitted into the Union. Early in 1861 an ordinance of secession was adopted, and Montgomery was made the temporary capital of the Confederacy. The State was the theater of war in 1862, and in 1864 Mobile was the scene of a naval battle, and her forts were silenced by Farragut. In 1865 Mobile, Selma, and Montgomery were taken by Federal troops, and a provisional governor was appointed by President Johnson later in that year. In 1868 a new constitution was adopted, and the State was readmitted to representation in congress.

On July 14, 1868, military rule ceased, and on November 16, 1870, the State ratified the fifteenth amendment to the Federal constitution. For a decade after the Civil War, Alabama suffered from maladministration. Party spirit ran very high, and elections were bitterly contested. The dishonesty of officials and the extravagant railway policy they pursued brought the State and the chief towns into serious financial difficulties. With the reorganization of the public debt in 1876 began an era of quiet and prosperity. Since 1874 Alabama has been invariably Democratic. In 1901 a constitutional convention changed the organic law in such a manner as to insure political supremacy to the white population.

**ALABAMA**, a river of the United States, in the State of Alabama, formed by the junction of the Coosa and the Tallapoosa. After a course of 300 miles it joins the Tombigbee and assumes the name of the Mobile.

**ALABAMA CLAIMS.** See Alabama, The.

**ALABAMA**, The, a ship built at Birkenhead, England, to act as a privateer in the service of the Confederate States of North America during the civil war begun in 1861. Before she was launched her destination was made known to the British government, but owing to some legal formalities the orders given for her detention did not reach Liverpool till the day after she had left that port (29th July, 1862). She received her armament and stores at the Azores, and entered on her destructive career, capturing and burning merchant vessels, till she was sunk in a fight with the Federal war steamer Kearsarge, off Cherbourg, 19th June, 1864. As early as the winter of 1862 the United States government declared that they held themselves entitled at a suitable period to demand full compensation from Britain for the damages inflicted on American property by the Alabama and several other cruisers that had been built, supplied, or recruited in British ports or waters. After a long series of negotiations it was agreed to submit the final settlement of the question to a court of arbitration, consisting of representatives of Britain, and the United States, and of three other members, appointed by the King of Italy, the President of Switzerland, and the Emperor of Brazil. This court



met at Geneva, 17th December, 1871, and a decree was given in September, 1872, that Britain was liable to the United States in damages to the amount of 15,500,000 dollars. After all awards were made to private claimants about 8,000,000 dollars still remain unclaimed.

**ALABASTER**, a name applied to a granular variety of gypsum or hydrated sulphate of lime. It has a fine granular texture, is usually of a pure white color, and is so soft that it can be scratched with the nail. It is found in many parts of Europe; in great abundance and of peculiarly excellent quality in Tuscany.

**ALAMEDA** (ā'la-mā'da), a city in Alameda county, California, six miles across the bay from San Francisco, on the Southern Pacific Railroad. Its growth has been rapid since 1870. Pop. 19,124.

**ALAMO**, a fort in Bexar county, Texas, U. S., celebrated for the resistance its occupants (140 Texans) made to a Mexican force of 4000 from 23d February to 6th March, 1836. At the latter date only six Texans remained alive, and on their surrendering they were slaughtered by the Mexicans.

**ALAND** (o'land) **ISLANDS**, a numerous group of islands and islets, about eighty of which are inhabited, belonging to Russia, situated in the Baltic Sea, near the mouth of the Gulf of Finland; area, 468 square miles. The principal island, Aland, distant about 30 miles from the Swedish coast, is 18 miles long and about 14 broad. It has a harbor capable of containing the whole Russian fleet. The fortress of Bomarsund, here situated, was destroyed by an Anglo-French force in August, 1854. The inhabitants, who are of Swedish extraction, employ themselves mostly in fishing. The islands were ceded by Sweden to Russia in 1809. Pop. 18,000.

**ALANI**, or **ALANS**, one of the warlike tribes which migrated from Asia westward at the time of the decline of the Roman empire. They are first met with in the region of the Caucasus, where Pompey fought with them. From this center they spread over the south of modern Russia to the confines of the Roman empire. About the middle of the fifth century they joined the Vandals, among whom they become lost to history.

**ALARM**, in military language, a signal, given by beat of drum, bugle-call, or firing of a gun, to apprise a camp or garrison of a surprise intended or actually made by the enemy. A place, called the alarm-post, is generally appointed at which the troops are to assemble when an alarm is given.—Alarm is also the name given to several contrivances in which electricity is made use of, as a fire-alarm, by which intelligence is at once conveyed to the proper quarter when a fire breaks out; a burglar-alarm, an arrangement of wires and a battery in a house intended to set a bell or bells ringing should a burglar attempt to gain entrance.

**ALARM-CLOCK**, one which can be set so as to ring loudly at a certain hour to wake from sleep or excite attention.

**ALASKA**, the largest of the territories of the United States, comprising a vast part of the northwest of the North

American continent. It was purchased in 1867 from Russia for \$7,200,000. Its area is 577,400 square miles, including not only an enormous tract of mainland, but Prince of Wales Island, the Alexander Archipelago, the Kadiak Islands, the Aleutian Islands, Pribyloff, and St. Lawrence Island in Bering Strait. Its coast line is longer than that of the Atlantic seaboard of the United States. The principal river is the Yukon, which rises in British Columbia less than 200 miles n.n.e. of Sitka, strikes a broad arc of a circle more than 2,000 miles long, and enters Bering Sea on the s. side of Norton Sound through an extensive delta. At 600 miles from the coast it is over a mile wide, and the volume of its water is so great as to freshen the water 10 miles off shore from its principal mouth. The next largest river is the Kuskokwim, which rises on the northern slopes of the Alaskan range of mountains to the eastward of the meridian of 150° w., and empties into Kuskokwim Bay, Bering Sea, in about lat. 60° n. Like the following, it is but little known. Next in order of size are the Colville, flowing into the Arctic Ocean e. of Point Barrow; the Copper, flowing southward from the Alaska Mountains, and emptying into the Bay of Alaska in about lon. 145° w.; the Suschitno, and several Arctic streams. The Rocky Mountains turn westward in about lat. 63° n. and pass into the Alaska Mountains, a range which runs first w., then s.w., and is finally prolonged into the peninsula of Alaska and the Aleutian Islands, the peaks in the two latter being often volcanic. This range apparently culminates in Mt. Wrangel, in about lon. 145° w., lat. 62° 30' n.; height, 17,500 feet. Near the coast is a less continuous range, which culminates in Mt. Logan (lat. 60° 30' n.), altitude 19,500 feet, thus overtopping Mt. Elias (18,100 feet), which is situated at the point where the U. S. boundary makes a turn from westward to northward, and which was long regarded as the highest peak north of Mexico. Among these coast mountains is Mt. Cook (in British territory), 15,750 feet, and Mt. Fairweather (U. S.), 15,500 feet. Glaciers are frequent among these mountains, and one from Mt. Elias dips its nose into salt water at Icy Bay.

The population for the whole Territory in 1880 was 33,426, of whom 17,617 were Eskimos, 11,478 Indians, 2,145 Aleuts, 1756 half-breeds, and 430 whites. In 1890 the census enumeration (necessarily largely an estimate), gave 4416 whites, 82 blacks, 1568 half-breeds, 13,735 natives not Eskimos, 2125 Chinese, 8400 Eskimos; total, 30,326. The census (1900) gives a total population of 63,592. Pop., (1908), 130,000.

The coast of this part of America was discovered by a Russian expedition under Bering in 1741. Settlements were gradually made, and the coast was at one time claimed as far s. as San Francisco. In 1799 the Territory was granted to a Russo-American fur company by the Emperor Paul VIII., and the charter was renewed in 1839. New Archangel, now Sitka, was the principal settlement. The privileges of the company expired

in 1863, and the Territory was purchased by the U. S. in 1867. Portions of the Territory were soon after explored by employees of the Russo-American Telegraph Company in surveying a route for an overland telegraph line to Europe. Explorations of the coast have since been continued by the Coast and Geodetic Survey. The Yukon has been explored by Dall and Schwatka, and Mt. Elias by several parties, the most successful of which was that of Russell in 1891. From Sept. 8, 1881, to Aug. 29, 1883, a well-equipped meteorological station of the U. S. Signal Service was kept at Point Barrow. In 1884 a district government was created by Congress, with a governor and a district court. The latter sits alternately at Sitka and Wrangel. The laws are those of Oregon. Sitka is the capital and has a land-office. The farming of the Pribyloff or Fur Seal islands in Bering Sea was at first granted to the Alaska Commercial Company at a rental amounting to about \$300,000 annually. On the expiration of their lease in 1890, the right was acquired by the North American Commercial Company.

A treaty was signed by the Secretary of State and the British Ambassador in Washington on Jan. 30, 1897, providing for the demarcation of so much of the boundary between Alaska and Canada as lies along the 141st meridian. The joint high commission appointed to attempt the settlement of all questions at issue between the U. S. and Canada made its award in 1903.

Alaska is rich in mineral wealth, has immense forests, and its fishing and sealing industries are enormous. Its most valuable exports are furs of seals, bears, foxes, otters, martens, beavers, and other animals. The salmon district has an output of 300,000 cases yearly. Gold is mined extensively in the Klondike district and valuable placer mines have been worked nearer the coast. The Sitka district is the most desirable for permanent residence. It has abundant forests and the climate is mild and the rainfall heavy.

**ALAU'DA**, a genus of insectorial birds, which includes the larks. See Lark.

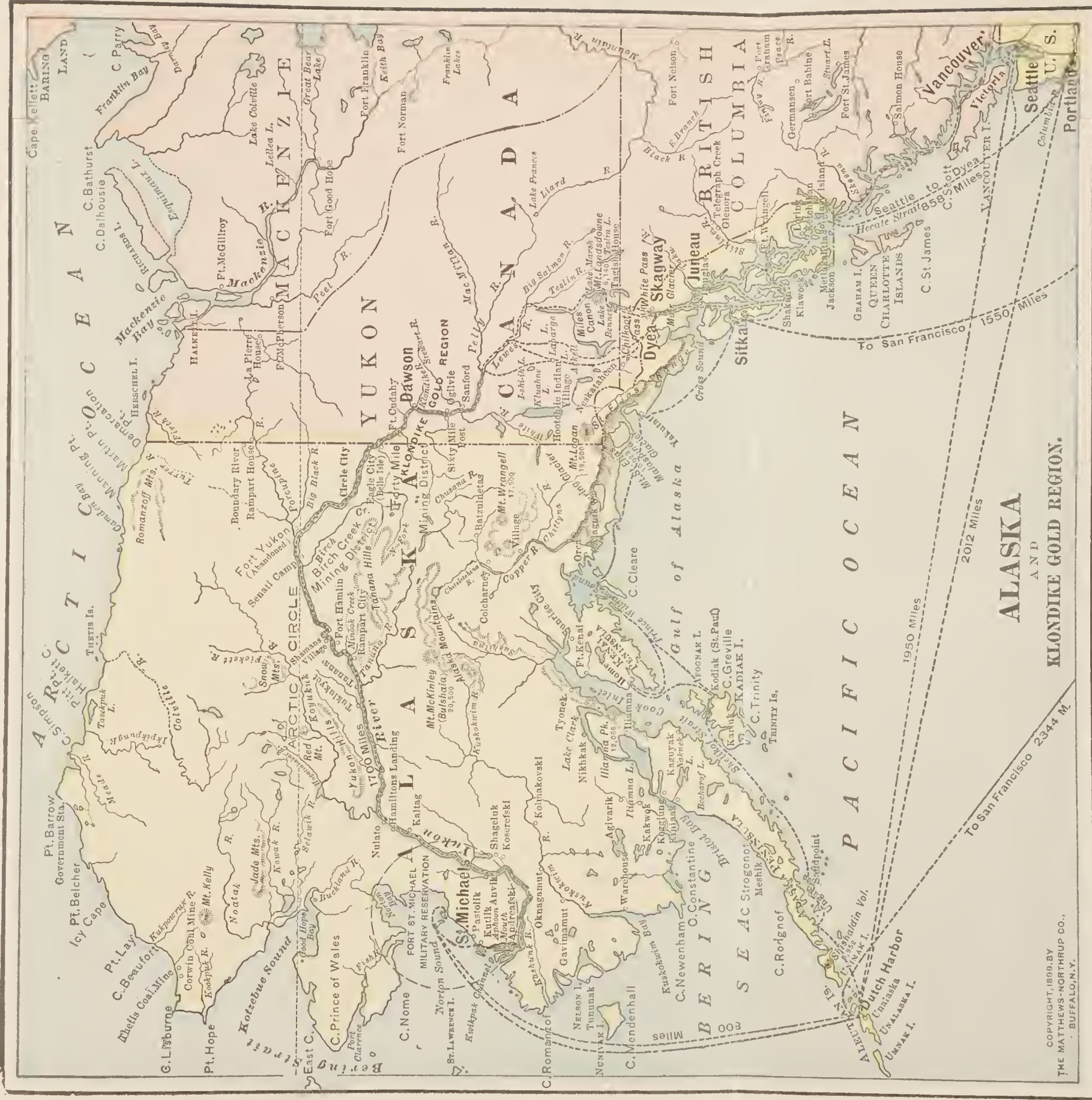
**A'LAVA**, a hilly province in the north of Spain, one of the three Basque provinces; area, 1207 sq. m.; covered by branches of the Pyrenees, the mountains being clothed with oak, chestnut, and other timber, and the valleys yielding grain, vegetables, and abundance of fruits. There are iron and copper mines, and inexhaustible salt springs. Capital, Vittoria. Pop. 93,538.

**ALB**, a clerical vestment worn by priests while officiating in the more solemn functions of divine service. It is a long robe of white linen reaching to the feet, bound round the waist by a cincture, and fitting more closely to the body than the surplice.

**ALBA**, Duke of. See Alva.

**ALBACETE** (al-ba-tha'tā), a town in southern Spain, capital of the province of the same name, 106 miles n.n.w. of Cartagena, with a considerable trade, both direct and transit, and manufactures of knives, daggers, etc. Pop. 21,637.—The province has an area of 6170 sq. m., and a pop. of 237,877.











**ALBAN**, St., the traditional protomartyr of Britain, who flourished in the third century, was, it is said, converted from Paganism by a confessor whom he had saved from his persecutors, and, refusing to sacrifice to the gods, was executed outside of the city of Verulamium (St. Albans) in 285 or 305.

**ALBANI** (ál-bā'nē), Francesco, a famous Italian painter, born at Bologna in 1578, died in 1660. Among the best known of his compositions are the Sleeping Venus, Diana in the Bath, Danaë Reclining, Galatea on the Sea, Europe on the Bull.

**ALBA'NIA**, an extensive region in the southwest of Turkey in Europe, stretching along the coast of the Adriatic for about 290 miles, and having a breadth varying from about 90 to about 50 miles. The boundary on the east is formed by a range of mountains, and the country is composed of at least nine ridges of hills, of which six are in lower or southern Albania (ancient Epirus) and the remainder in central and upper or northern Albania. There are no large rivers, and in summer many of the streams are completely dry. The Drin or Drino is the largest. The most beautiful lake is that of Ochrida, 20 miles long, 8 broad at the widest part. The Lake of Scutari, in upper Albania, is the largest. Among trees Albania has many species of oak, the poplar, hazel, plane, chestnut, cypress, and laurel. The vine flourishes, together with the orange, almond, fig, mulberry, and citron; maize, wheat, and barley are cultivated. Its fauna comprises bears, wolves, and chamois; sheep, goats, horses, asses, and mules are plentiful. The chief exports are live stock, wool, hides, timber, oil, salt-fish, cheese, and tobacco. The chief ports are Prevesa, Avlona, and Durazzo. The population, about 1,400,000, consists chiefly of Albanians or Arnauts, or, as they call themselves, Skipetars (mountaineers), with a certain number of Greeks and Turks. The Albanians are distinct in race and language from the surrounding peoples. They are only half civilized,



Albanian peasantry.

are divided into a number of clans, and bloody feuds are still common among them. They belong partly to the Greek, partly to the Roman Catholic Church, but the great majority are Moham-

medans. Though their country became a province of the Turkish dominions in the fifteenth century, they still maintain a certain degree of independence, which the Porte has never found it possible to overcome.

**AL'BANY**, the original Celtic name probably at first applied to the whole of Britain, but latterly restricted to the Highlands of Scotland.

**AL'BANY**, a city of the United States, capital of the State of New York on the west bank of the Hudson, 132 miles north of New York City, from and to which steamboats run daily. The Erie Canal and the numerous railway lines centering here from all directions greatly contribute to the growth and prosperity of the city, which carries on an extensive trade. It is a great mart for timber, and has foundries, breweries, tanneries, etc. Albany was settled by the Dutch in 1610-14, and the older houses are in the Dutch style, with the gable-ends to the streets. There is a university, an observatory, and a state library with 90,000 volumes. The principal public edifices are the capitol or state-house, the state-hall for the public offices, a state arsenal, and numerous religious edifices. Pop. (1908), 98,537.



Albatros.



Wandering albatros.

**AL'BATROS**, a large marine swimming bird of several species, of which the wandering albatros is the best known. The bill is straight and strong, the upper mandible hooked at the point and the lower one truncated; there are three webbed toes on each foot. The upper part of the body is of a grayish brown, and the belly white. It is the largest sea-bird known, some measuring 17½ feet from tip to tip of their expanded wings. They abound at the Cape of Good Hope and in other parts of the southern seas, and in Bering's Straits, and have been known to accompany ships for whole days without ever resting on the waves. From this habit the bird is regarded with feelings of attachment and superstitious awe by sailors, it being reckoned unlucky to kill one. Coleridge has availed himself of this feeling in his *Ancient Mariner*. The albatros is met with at great distances from the land, settling down on the waves at night to sleep. It is exceedingly voracious, whenever food is abundant gorging to such a degree as to be unable to fly or swim. It feeds on fish, carrion, fish-

spawn, oceanic mollusca, and other small marine animals. Its voice is a harsh, disagreeable cry. Its nest is a heap of earth; its eggs are larger than those of a goose.

**ALBERONI**, Cardinal Giulio (jū'li-o ál-bā-rō'nē), born in 1664 in north Italy, and educated for the church. The Duke of Parma sent him as his minister to Madrid, where he gained the affection of Philip V. He rose by cunning and intrigue to the station of prime-minister, became a cardinal, was all-powerful in Spain after the year 1715, and endeavored to restore it to its ancient splendor. He died at Rome in 1752.

**AL'BERT I.**, Duke of Austria, and afterward Emperor of Germany, son of Rodolph of Hapsburg, was born in 1248. On the death of his father in 1292 he claimed the empire, but his arrogant conduct drove the electors to choose Adolphus of Nassau emperor. Adolphus, after a reign of six years, having lost the regard of all the princes of the empire Albert was elected to succeed him. Pope Boniface VIII., however, refused to acknowledge him as emperor. Albert formed an alliance with Philip le Bel of France, and offered so determined and successful a resistance to the papal authority that Boniface was induced to withdraw his opposition, on condition that Albert would break with his French ally. He was assassinated, at Aix-la-Chapelle in 1298, by his nephew, John, Duke of Suabia, whose inheritance he had seized upon, in 1308.

**ALBERT**, first Duke of Prussia, and last grand-master of the Teutonic Order, was born in 1490; died in 1568.

**ALBERT**, Prince, Albert-Francis-Augustus-Charles-Emmanuel, Prince of Saxe-Coburg-Gotha, and Prince Consort of England, second son of Ernest I., Duke of Saxe-Coburg, was born at the Rosenau, a castle near Coburg, on 26th August, 1819. In 1837 he entered the University of Bonn, where he devoted himself to the studies of political and natural science, history, philosophy, etc., as well as to those of music and painting. On leaving the university he



Albert, Prince Consort.

made a tour through the chief cities of Italy with Baron Stockmar. On the 10th Feb. 1840, he married his cousin, Queen Victoria of England. An allowance of \$150,000 a year was settled upon



the prince, who was naturalized by act of Parliament, received the title of Royal Highness by patent, was made a field-marshal, a Knight of the Garter, of the Bath, etc. Other honors were subsequently bestowed upon him, the chief of which was the title of Prince Consort (1857). His foreign birth at first caused him to be regarded with some suspicion, but his unflinching tact and genuine ability were not long in gaining their due recognition. His services to the cause of science and art were very important; he presided over the commission appointed in 1841 to consider the best means of rebuilding the houses of parliament, and the great exhibition of 1851 owed much of its success to his activity, knowledge, and judgment. The amendment of the Articles of War in 1844 which ultimately put an end to dueling was due to his suggestion. He died of typhoid fever on December 14, 1861, after a short illness.

**ALBERTA**, since 1905 one of the provinces of Canada, having Assiniboia and Saskatchewan on the east, British Columbia on the west, the United States on the south, and Athabasca on the north; area, 253,540 sq. miles; pop. 75,000. It is a fertile, grassy region, with trees in the river valleys; coal is abundant and gold is found near Edmonton. The capital is Edmonton.

**ALBERT NYAN'ZA**, a lake of Africa, one of the head-waters of the Nile, lying (approximately) between lat. 2° 30' and 1° 10' n., and with its northeast extremity in about lon. 28° e.; general direction from northeast to southwest, surface about 2500 feet above sea-level. It is surrounded by precipitous cliffs, and bounded on the west and southwest by great ranges of mountains. It abounds with fish, and its shores are infested with crocodiles and hippopotamuses. It receives the Victoria Nile from the Victoria Nyanza, and the White Nile issues from its northern extremity.

**ALBIGENSES** (al-bi-jen'séz), a sect which spread widely in the south of France and elsewhere about the twelfth century, and which differed in doctrine and practice from the Roman Catholic Church, by which they were subjected to severe persecution.

**ALBINOS** (al-bi'nôz), the name given to those persons from whose skin, hair, and eyes, in consequence of some defect in their organization, the dark coloring matter is absent. The skin of albinos, therefore, whether they belong to the white, Indian, or negro races, is of a uniform pale milky color, their hair is white, while the iris of their eyes is pale rose color, and the pupil intensely red, the absence of the dark pigment allowing the multitude of blood-vessels in these parts of the eye to be seen. For the same reason their eyes are not well suited to endure the bright light of day, and they see best in shade or by moonlight. The peculiarity of albinism or leucopathy is always born with the individual, and is not confined to the human race, having been observed also in horses, rabbits, rats, mice, etc., birds (white crows or blackbirds are not particularly uncommon), and fishes.

**AL'BION**, the earliest name by which the island of Great Britain was known, employed by Aristotle, and in poetry still used for Great Britain. The same word as Albany, Albyn.

**AL'BITE**, or **SODA-FELSPAR**, a mineral, a kind of feldspar, usually of a white color, to which property it owes its name, but occasionally bluish, grayish, greenish, or reddish white.

**AL'BOIN**, King of the Lombards, succeeded his father Audoin in 561, and reigned in Noricum and Pannonia. After a victorious career in Italy he was slain at Verona, in 573 or 574, by an assassin, instigated by his wife Rosamond, whose hatred he had incurred by sending her, in one of his fits of intoxication, a cup wrought from the skull of her father, and forcing her to drink from it.

**ALBRET**, Jeanne d' (zhân dâl-brâ), Queen of Navarre, wife of Antoine de Bourbon and mother of Henri IV. of France, a zealous supporter of the reformed religion, which she established in her kingdom; born 1528, died (probably poisoned) 1572, shortly before the massacre of St. Bartholomew.

**AL'BUM**, a name now generally given to a blank book for the reception of pieces of poetry, autographs, engravings, photographs, etc.

**ALBU'MEN**, or **ALBUMIN**, a substance, or rather group of substances, so named from the Latin for the white of an egg, which is one of its most abundant known forms. It may be taken as the type of the protein compounds or the nitrogenous class of foodstuffs. One variety enters largely into the composition of the animal fluids and solids, is coagulable by heat at and above 160°, and is composed of carbon, hydrogen, nitrogen, and oxygen, with a little sulphur. It abounds in the serum of the blood, the vitreous and crystalline humors of the eye, the fluid of dropsy, the substance called coagulable lymph, in nutritive matters, the juice of flesh, etc. The blood contains about 7 per cent of albumen. Another variety called vegetable albumen exists in most vegetable juices and many seeds, and has nearly the same composition and properties as egg albumen. When albumen coagulates in any fluid it readily incloses any substances that may be suspended in the fluid. Hence it is used to clarify syrupy liquors. In cookery white of eggs is employed for clarifying, but in large operations like sugar-refining the serum of blood is used. From its being coagulable by various salts, and especially by corrosive sublimate, with which it forms an insoluble compound, white of egg is a convenient antidote in cases of poisoning by that substance. With lime it forms a cement to mend broken ware.

In botany the name albumen is given to the farinaceous matter which surrounds the embryo, the term in this case having no reference to chemical composition. It constitutes the meat of the cocoanut, the flour or meal of cereals, the roasted part of coffee, etc.

**ALBUMINU'RIA**, a condition in which the urine contains albumen, evidencing a diseased state of the kidneys.

**ALBUR'NUM**, the soft white substance which, in trees, is found between the liber or inner bark and the wood, and, in progress of time acquiring solidity, becomes itself the wood. A new layer of wood, or rather of alburnum, is added annually to the tree in every part just under the bark.

**ALCALDE** (Spanish; al-kal-dā), or **ALCAIDE** (Portuguese; al-ki'dā), the name of a magistrate in the Spanish and Portuguese towns, to whom the administration of justice and the regulation of the police is committed. His office nearly corresponds to that of justice of the peace. The name and the office are of Moorish origin.

**ALCES'TIS**, in Greek mythology, wife of Admetus, king of Thessaly. Her husband was ill, and, according to an oracle, would die unless some one made a vow to meet death in his stead. This was secretly done by Alcestis, and Admetus recovered. After her decease Hercules brought her back from the infernal regions.

**AL'CHEMY**, or **ALCHYMY**, the art which in former times occupied the place of and paved the way for the modern science of chemistry (as astrology did for astronomy), but whose aims were not scientific, being confined solely to the discovery of the means of indefinitely prolonging human life, and of transmuting the baser metals into gold and silver. Among the alchemists it was generally thought necessary to find a substance which, containing the original principle of all matter, should possess the power of dissolving all substances into their elements. This general solvent, or menstruum universale, which at the same time was to possess the power of removing all the seeds of disease out of the human body and renewing life, was called the philosopher's stone, and its pretended possessors were known as adepts. Alchemy flourished chiefly in the middle ages, though how old might be such notions as those by which the alchemists were inspired it is difficult to say. When more rational principles of chemistry and philosophy began to be diffused and to shed light on chemical phenomena, the rage for alchemy gradually decreased. It is still impossible to assert anything with certainty about the transmutation of metals. Modern chemistry, indeed, places metals in the class of elements, and denies the possibility of changing an inferior metal into gold. But hitherto chemistry has not succeeded in unfolding the principles by which metals are formed and the laws of their production, or in aiding or imitating this process of nature.

**ALCIBI'ADES** (-dēz), an Athenian of high family and of great abilities, but of no principle, was born at Athens in B.C. 450, being the son of Cleinias, and a relative of Pericles, who also was his guardian. He acquired great popularity by his liberality in providing for the amusements of the people, and after the death of Cleon attained a political ascendancy which left him no rival but Nicias. Thus he played an important part in the long-continued Peloponnesian war. In 415 he advocated the expedition against Sicily, and



was chosen one of the leaders, but before the expedition sailed he was charged with profaning and divulging the Eleusinian mysteries, and mutilating the busts of Hermes, which were set up in public all through Athens. Rather than stand his trial he went over to Sparta, divulged the plans of the Athenians, and assisted the Spartans to defeat them. He soon left Sparta and took refuge with the Persian satrap Tissaphernes, ingratiating himself by his affectation of Persian manners, as he had previously done at Sparta by a similar affectation of Spartan simplicity. He now began to intrigue for his return to Athens, offering to bring Tissaphernes over to the Athenian alliance, and latterly he was recalled and his banishment canceled. He, however, remained abroad for some years in command of the Athenian forces, gained several victories, and took Chalcedon and Byzantium. In B.C. 407 he returned to Athens, but in 406, the fleet which he commanded having suffered a severe defeat, he was deprived of his command. He once more went over to the Persians, taking refuge with the satrap Pharnabazus of Phrygia, and here he was assassinated in B.C. 404.

**ALCO**, a small variety of dog, with a small head and large pendulous ears, found wild in Mexico and Peru, and also domesticated.

**ALCOHOL**, the purely spirituous or intoxicating part of all liquids that have undergone vinous fermentation, extracted by distillation—a limpid colorless liquid, of an agreeable smell and a strong pungent taste. When brandy, whisky, and other spirituous liquors, themselves distilled from cruder materials, are again distilled, highly volatile alcohol is the first product to pass off. The alcohol thus obtained contains much extraneous matter, including a proportion of water, from the first as high as 20 or 25 per cent, and increasing greatly as the process continues. Charcoal and carbonate of soda put in the brandy or other liquor partly retain the fusel-oil and acetic acid it contains. The product thus obtained by distillation is called rectified spirits or spirits of wine, and contains from 55 to 85 per cent of alcohol, the rest being water. By distilling rectified spirits over carbonate of potassium, powdered quicklime, or chloride of calcium, the greater part of the water is retained, and nearly pure alcohol passes over. It is only, however, by very prolonged digestion with desiccating agents and subsequent distillation that the last traces of water can be removed. The specific gravity of alcohol varies with its purity, decreasing as the quantity of water it contains decreases. This property is a convenient test of the alcoholic strength of liquors that contain only alcohol and water; but, on account of the condensation that invariably takes place on the mixture of these two liquids, it can be applied only in connection with special tables of reference, or by means of an instrument specially adapted for the purpose. (See Alcoholometer.) By simple distillation the specific gravity of alcohol can

scarcely be reduced below  $^{\circ}825$  at  $60^{\circ}$  Fahr.; by rectification over chloride of calcium it may be reduced to  $^{\circ}794$ ; as it usually occurs it is about  $^{\circ}820$ . Alcohol is composed of carbon, hydrogen, and oxygen, in the proportions expressed by the formula  $C_2H_6O$ . Under a barometric pressure of 29.5 inches it boils at  $173^{\circ}$  Fahr. ( $78^{\circ}4$  C.); in the exhausted receiver of an air-pump it boils at ordinary temperatures. Its congelation has been effected only in recent times at the low temperature of



Alcyonaria.

1. Sea-fan. 2. Sea-pen. 3. Cornuldrina rugosa.

$-203^{\circ}$  Fahr. Its very low freezing-point renders it valuable for use in thermometers for very low temperatures. Alcohol is extremely inflammable, and burns with a pale-blue flame, scarcely visible in bright daylight. It occasions no carbonaceous deposit upon substances held over it, and the products of its combustion are carbonic acid and water. The steady and uniform heat which it gives during combustion makes it a valuable material for lamps. It dissolves the vegetable acids, the volatile oils, the resins, tan, and extractive matter, and many of the soaps; the greater number of the fixed oils are taken up by it in small quantities only, but some are dissolved largely. When alcohol is submitted to distillation with certain acids a peculiar compound is formed, called ether. It is alcohol which gives all intoxicating liquors the property whence they are so called. Alcohol acts strongly on the nervous system, and though in small doses it is stimulating and exhilarating, in large doses it acts as a poison. In medicine it is often of great service.

The name alcohol is also applied in chemistry to a large group of compounds of carbon, hydrogen, and oxygen, whose chemical properties are analogous to that of common or ethylic alcohol.

**ALCOHOLISM**, a morbid condition of the body (especially of the nervous system) brought on by the immoderate use of alcoholic liquors.

**ALCOHOLOMETER**, an instrument constructed on the principle of the hydrometer, to determine from the specific gravity of spirituous liquors the percentage of alcohol they contain, the scale marking directly the required proportion. If the liquor contain anything besides water and alcohol, previous distillation is necessary.

**ALCO'RAN**. See Koran.

**AL'COTT**, Lowisa May, a distinguished American authoress, born in 1833. She has written a number of books chiefly intended for the young: *Little Women*, *An Old-fashioned Girl*, *Little Men*, *Jack and Gill*, etc. Died in 1888.

**AL'COVE**, a recess in a room, usually separated from the rest of the room by columns, a balustrade, or by curtains, and often containing a bed or seats.

**ALCYONA'RIA**, animals forming a great division of the class Actinozoa. (See Sea-anemone.) These animals are nearly all composite, and the individual polyps have mostly eight tentacles. They include the organ-pipe corals, sea-pens, fan-corals, etc., as also the red coral of commerce. The polyps essentially resemble those of the genus *Alcyonium* in structure, and in the number and arrangement of the tentacles.

**ALCYO'NIUM**, a genus of animals, one familiar species of which, dredged around the British coasts, is named "Dead-Men's Fingers," or "Cow's Paps," from its lobed or digitate appearance. It grows attached to stones, shells, and other objects. It consists of a mass of little polyps, each polyp possessing eight little fringed tentacles disposed around a central mouth. The *Alcyonium* forms the type of the Alcyonaria.

**ALDEB'ARAN**, a star of the first magnitude, forming the eye of the constellation Taurus or the Bull, the brightest of the five stars known to the Greeks as the Hyades. Spectrum analysis has shown it to contain antimony, bismuth, iron, mercury, hydrogen, sodium, calcium, etc.

**AL'DEHYDE**, the oxidation product of an alcohol intermediate between it and its acid. Common aldehyde is derived from spirit of wine by oxidation, and is a colorless, limpid, volatile, and inflammable liquid, with a peculiar ethereal odor, which is suffocating when strong; specific gravity, 0.79. It oxidizes in air, and is converted into acetic acid. It rapidly decomposes oxide of silver, depositing a brilliant film of metallic silver; hence it is used in silvering curved glass surfaces.

**ALDEN**, Henry Mills, an American author born at Mt. Tabor, Vt., in 1836. He was a classmate of James A. Garfield in the class of 1857 at Williams College. He has been editor of *Harper's Weekly* and *Harper's Monthly*, and is noted for his contributions to the criticism of Greek literature. He has also published volumes of essays, poems, and prose poems.

**ALDEN**, Mrs. Isabella McDonald, an American author. She was born at Rochester, N. Y., in 1841, and early in her career became widely known through her juvenile stories currently known as the Pansy Books. Her works have been translated into several foreign languages.

**ALDEN**, John, an early American settler, one of the Pilgrim Fathers. He helped to repair the Mayflower, sailed in her, and signed the compact. He settled at Duxbury, Mass., and married Priscilla Mullens. Alden outlived all the other signers of the compact and has been immortalized by Longfellow in his poem, *The Courtship of Miles Standish*.



**ALDER** (al'der), a genus of plants, consisting of trees and shrubs inhabiting the temperate and colder regions of the globe. Common alder is a tree which grows in wet situations in Europe, Asia, and the United States. Its wood, light and soft and of a reddish color, is used for a variety of purposes, and is well adapted for work which is to be kept constantly in water. The roots and knots furnish a beautifully-veined wood well suited for cabinet work. The bark is used in tanning and leather dressing, and by fishermen for staining their nets. This and the young twigs are sometimes employed in dyeing, and yield different shades of yellow and red. With the addition of copperas it yields a black dye.

**AL'DERMAN**, in the United States a representative of a ward or district in the legislative department of a town or city. In some cities aldermen hold separate courts and have the power of a magistrate to a limited extent.

**AL'DERNEY**, an island belonging to Britain off the coast of Normandy. The coast is bold and rocky, the interior is fertile. About a third of the island is occupied by grass lands; and the Alderney cows, a small-sized but handsome breed, are famous for the richness of their milk. The climate is mild and healthful. The French language still prevails among the inhabitants, but all understand and many speak English. —The Race of Alderney is the strait between the coast of France and this island. Pop. 2062.

**ALDERSHOT** (al'dér-), a town and military station in England, the latter having given rise to the former. The number of troops usually maintained at Aldershot is about 7000. The town is in the neighborhood of the barracks, immediately beyond the government ground, and in Hampshire. Pop. (including military), 30,974.

**AL'DINE EDITIONS**, the name given to the works which proceeded from the press of Aldus Manutius and his family at Venice (1490–1597). (See Manutius.) Recommended by their value, as well as by a splendid exterior, they have gained the respect of scholars and the attention of book-collectors. Many of them are the first printed editions of Greek and Latin classics. Others are texts of the modern Italian authors. These editions are of importance in the history of printing. Aldus had nine kinds of Greek type, and no one before him printed so much and so beautifully in this language. Of the Latin character he procured fourteen kinds of type.

**AL'DRICH**, Thomas Bailey, American poet and writer of prose tales, born at Portsmouth, N. H., Nov. 11, 1836. He was early engaged in commercial occupations, but abandoned them for journalism, and was the editor of several publications, including the *Atlantic Monthly*. His works comprise *The Bells*, *Ballad of Baby Bell*, *Cloth of Gold*, *Prudence Palfrey*, etc. He died in 1907.

**ALE** and **BEER**, well-known and extensively used fermented liquors, the principle of which is extracted from several sorts of grain, but most com-

monly from barley, after it has undergone the process termed malting. Beer is a more general term than ale, being often used for any kind of fermented malt liquor, including porter, though it is also used in a more special signification. See *Brewing*.

**ALEMBERT** (à-lan-bâr), Jean le Rond d', a French mathematician and philosopher, born in Paris in 1717, and died there in 1783. He was the illegitimate son of Madame de Tencin, and was exposed at the Church of St. Jean le Rond (hence his name) soon after birth. He was brought up by the wife of a poor glazier, and with her he lived for more than forty years. His parents never publicly acknowledged him, but his father settled upon him an income of 1200 livres. He showed much quickness in learning, entered the College Mazarin at the age of twelve, and studied mathematics with enthusiasm and success. Having left college he studied law and became an advocate, but did not cease to occupy himself with mathematics. A pamphlet on the motion of solid bodies in a fluid, and another on the integral calculus, which he laid before the Academy of Sciences in 1739 and 1740, showed him in so favorable a light that the Academy received him in 1741 into the number of its members. He soon after published his famous work on dynamics, *Traité de Dynamique* (1743); and that on fluids, *Traité des Fluides*. He also took a part in the investigations which completed the discoveries of Newton respecting the motion of the heavenly bodies, and published at intervals various important astronomical dissertations, as well as on other subjects. He also took part, with Diderot and others, in the celebrated *Encyclopédie*, for which he wrote the *Discours Préliminaire*, as



T. B. Aldrich.

well as many philosophical and almost all the mathematical articles.

**ALEMTEJO** (à-lân-tā'zhô), the largest province of Portugal, and the most southern except Algarve; area, 10,255 sq. miles; pop. 413,531. The capital is Evora.

**ALENCON** (à-lân-sôn), a town of France, capital of department Orne, and formerly of the Duchy of Alençon, on the right bank of the Sarthe, 105 miles west by south of Paris; well built. Alençon was long famed for its point-lace, called "point d'Alençon." Pop. 17,237.—Alençon, originally a county, later a dukedom, became united with the crown in 1221, and was given by Louis XI. as an appanage to his fifth son, with whom the branch of the Alençon Valois commenced. The first duke of the name lost his life at the battle of Agincourt in 1415; another, called Charles IV., married the celebrated Margaret of Valois, sister of Francis I. He commanded the left wing of the French army at the battle of Pavia, where, instead of supporting the king at a critical moment, he fled at the head of his troops, the consequence of which was the loss of the battle and the capture of the king.



Aleppo.

**ALEP'PO**, a city of Asiatic Turkey, in northern Syria, on the river Koik, in a fine plain 60 miles southeast of Alexandretta, which is its port, and 195 miles n.e. of Damascus. Pop. 100,000.

**ALETSCH'-GLACIER**, the greatest glacier in Switzerland, canton Valais, a prolongation of the immense mass of glaciers connected with the Jungfrau, the Aletschhorn (14,000 ft.), and other peaks; about 15 miles long.

**ALEUROM'ETER**, an instrument for indicating the bread-making qualities of wheaten flour. The indications depend upon the expansion of the gluten contained in a given quantity of flour when freed of its starch by pulverization and repeated washings with water.

**ALEU'TIAN ISLANDS**, a chain of about eighty small islands belonging to the United States, separating the Sea of Kamtchatka from the northern part of the Pacific Ocean, and extending nearly 1000 miles from east to west between lon. 172° e. and 163° w.; total area, 6391 square miles; pop. 1220. They are of volcanic formation, and in a number of them there are volcanoes still in activity. The natives belong to the same stock with those of Kamtchatka.

**ALE'WIFE**, a fish of the same genus as the shad, growing to the length of 12 inches, and taken in great quantities in the mouths of the rivers of New England, New Brunswick, and Nova Scotia, being salted and exported.

**ALEXANDER**, surnamed the Great, was the son of Philip of Macedon and his queen Olympias, and was born at Pella,



**B.C. 356.** In youth he had Aristotle as instructor, and he early displayed uncommon abilities. The victory of Chæroneia in 338, which brought Greece entirely under Macedonia, was mainly decided by his efforts. Philip having been assassinated, B.C. 336, Alexander, not yet twenty years of age, ascended the throne. His father had been preparing an expedition against the Persians and Alexander determined to carry it out; but before doing so he had to chastise the barbarian tribes on the frontiers of Macedonia as well as quell a rising in Greece, in which he took and destroyed Thebes, put 6000 of the inhabitants to the sword, and carried 30,000 into captivity. His first encounter with the Persian forces (assisted by Greek mercenaries) was at the small river Granicus, where he gained a complete victory. Most of the cities of Asia Minor now opened their gates to the victor, and Alexander restored democracy in all the Greek cities. In passing through Gordium he cut the Gordian knot, on which it was believed



Coin of Alexander the Great.

the fate of Asia depended, and then conquered Lycia, Ionia, Caria, Pamphylia, and Cappadocia. A sickness, caused by bathing in the Cydnus (B.C. 333), checked his course; but scarcely was he restored to health when he continued his onward course, and this same year defeated the Persian emperor Darius and his army of 500,000 or 600,000 men (including 50,000 Greek mercenaries), near Issus (inner angle of the Gulf of Alexandretta). Alexander did not pursue Darius, but proceeded southward, and secured all the towns along the Mediterranean Sea, though he did not get possession of Tyre (taken 332 B.C.) without a siege of seven months. Palestine and Egypt now fell before him, and in the latter he founded Alexandria, which became one of the first cities of ancient times. On his return Alexander marched against Darius, who had collected an immense army in Assyria, and rejected the proposals of his rival for peace. A battle was fought at Gaugamela, about 50 miles from Arbela, B.C. 331, and, notwithstanding the immense numerical superiority of his enemy, Alexander (who had but 40,000 men and 7000 horse) gained a complete victory. Babylon and Susa opened their gates to the conqueror, who marched toward Persepolis, the capital of Persia, and entered it in triumph. Continuing his progress he subdued Bessus, and advanced to the Jaxartes, the extreme eastern limit of the empire, but did not fully subdue the whole of this region till 328, some fortresses holding out with great tenacity. In one of these he

took prisoner the beautiful Roxana, daughter of Oxyartes, a nobleman of Sogdiana, and having fallen in love with her he married her. Alexander now formed the idea of conquering India, then scarcely known even by name. He passed the Indus (B.C. 326), marched toward the Hydaspes (Jhelum), at the passage of which he conquered a king named Porus in a bloody battle, and advanced victoriously through the northwest of India, and intended to proceed as far as the Ganges, when the murmurs of his army compelled him to return. On the Hydaspes he built a fleet, in which he sent a part of his army down the river, while the rest proceeded along the banks. By the Hydaspes he reached the Acesines (Chenab), and thus the Indus, down which he sailed to the sea. Nearchus, his admiral, sailed hence to the Persian Gulf, while Alexander directed his march by land to Babylon, losing a great part of his troops in the desert through which he had to pass. In Susa he married Statira, the eldest daughter of Darius, and rewarded those of his Macedonians who had married Persian women, because it was his intention to unite the two nations as closely as possible. At Opis, on the Tigris, a mutiny arose among his Macedonians (in 324), who thought he showed too much favor to the Asiatics; by firmness and policy he succeeded in quelling this rising, and sent home 10,000 veterans with rich rewards. Soon after, his favorite horse, Bucephalus, died at Ecbatana, and Alexander's grief was unbounded. The favorite was royally buried at Babylon, and here Alexander was engaged in extensive plans for the future, when he became suddenly sick, after a banquet, and died in a few days (323 B.C.), in his thirty-third year, after a reign of twelve years and eight months. His body was after a time conveyed to Egypt with great splendor by his general Ptolemy. He left behind him an immense empire, which was divided among his chief generals, and became the scene of continual wars. The reign of Alexander constitutes an important period in the history of humanity. His career was not merely a series of empty conquests, but was attended with the most important results. The language, and much of the civilization of Greece, followed in his track; large additions were made to the sciences of geography, natural history, etc.; a road was opened to India; and the products of the farthest east were introduced into Europe. Greek kingdoms, under his generals and their successors, continued to exist in Asia for centuries.

**ALEXANDER**, the name of eight popes, the earliest of whom, Alexander I., is said to have reigned from 109 to 119. The most famous (or infamous) is **ALEXANDER VI.** (Borgia), who was born at Valencia, in Spain, in 1431, and died in 1503. When he was only twenty-five years of age his uncle, Pope Calixtus III., made him a cardinal, and shortly afterward appointed him to the dignified and lucrative office of vice-chancellor. By bribery he prepared his way to the papal throne, which he attained in 1492, after the death of

Innocent VIII. Both the authority and revenues of the popes being at this time much impaired, he set himself to reduce the power of the Italian princes, and seize upon their possessions for the benefit of his own family. To effect this end he is said not to have scrupled to use the vilest means, including poison and assassination. His policy, foreign as well as domestic, was faithless and base, and his private life was stained by sensuality. He understood how to extract immense sums of money from all Christian countries under various pretexts. He sold indulgences, and set aside, in favor of himself, the wills of several cardinals. His excesses roused against him the powerful eloquence of Savonarola, who, by pen and pulpit, urged his deposition, but had to meet his death at the stake in 1498. Not long after his election Alexander had the honor of deciding the dispute between the kings of Portugal and Castile concerning their respective claims to the foreign countries recently discovered. His son, Cesare Borgia, and his daughter, Lucrezia, are equally notorious with himself.

**ALEXANDER**, the name of three Scottish kings. **ALEXANDER I.**, a son of Malcolm Canmore and Margaret of England, succeeded his brother Edgar in 1107, and governed with great ability till his death in 1124.—**ALEXANDER II.** was born in 1198, and succeeded his father William the Lion in 1214. He died in 1248 at Kerrera, an island opposite Oban, when on an expedition in which he hoped to wrest the Hebrides from Norway. He was succeeded by his son, **ALEXANDER III.**, a boy of eight, who in 1251 married Margaret, eldest daughter of Henry III. of England. Like his father he was eager to bring the Hebrides under his sway, and this he was enabled to accomplish in a few years after the defeat of the Norse King Haco at Largs, in 1263. The mainland and islands of Scotland were now under one sovereign, though Orkney and Shetland still belonged to Norway.

**ALEXANDER I.**, Emperor of Russia, son of Paul I. and Maria, daughter of Prince Eugene of Würtemberg, was born in 1777, and died in 1825. On the assassination of his father, in 1801, Alexander ascended the throne, and one of his first acts was to conclude peace with Britain, against which his predecessor had declared war. In 1803 he offered his services as mediator between England and France, and two years later a convention was entered into between Russia, England, Austria, and Sweden for the purpose of resisting the encroachments of France on the territories of independent states. He was present at the battle of Austerlitz (1805), when the combined armies of Russia and Austria were defeated by Napoleon. In the succeeding campaign the Russians were again beaten at Eylau (8th February, 1807) and Friedland (14th June), the result of which was an interview, between Alexander and Napoleon, and the treaty at Tilsit. The Russian emperor now for a time identified himself with the Napoleonic schemes, and soon obtained possession of Finland and an extended territory



on the Danube. The French alliance, however, he found to be too oppressive, and his having separated himself from Napoleon led to the disastrous French invasion of 1812. In 1813 he published a manifesto which served as the basis of the coalition of the other European powers against France, which was followed by the capture of Paris (in 1814), the abdication of Napoleon and the restoration of the Bourbons, and the utter overthrow of Napoleon the following year. After Waterloo, Alexander, accompanied by the Emperor of Austria and the King of Prussia, made his second entrance into Paris, where they concluded the treaty known as the Holy Alliance. The remaining part of his reign was chiefly taken up in measures of internal reform, including the gradual abolition of serfdom, and the promotion of education, agriculture, commerce, and manufactures, as well as literature and the fine arts.

**ALEXANDER II.**, Emperor of Russia, was born April 29, 1818, and succeeded his father Nicholas in 1855, before the end of the Crimean war. After peace was concluded the new emperor set about effecting reforms in the empire, the greatest of all being the emancipation of the serfs in 1861, a measure which gave freedom, on certain conditions, to 22,000,000 of human beings who were previously in a state little removed from that of slavery. Under him, too, representative assemblies in the provinces were introduced, and he also did much to improve education, and to reorganize the judicial system. During his reign the Russian dominions in central Asia were extended, a piece of territory south of the Caucasus, formerly belonging to Turkey, was acquired, and a part of Bessarabia, belonging since the Crimean war to Turkey in Europe, but previously to Russia, was restored to the latter power. The latter additions resulted from the Russo-Turkish war of 1877-78. He was killed by an explosive missile flung at him (by a Nihilist it is supposed) in a street in St. Petersburg, 13th March, 1881. He was succeeded by his second son Alexander III., his eldest son having died in youth. Alexander III.'s policy was reactionary. He died in 1894.

**ALEXANDER SEVERUS**, a Roman emperor, born in 205, died 235 A.D. He was raised to the imperial dignity in 222 A.D. by the prætorian guards, after they had put his cousin the emperor Heliogabalus to death. When on an expedition into Gaul to repress an incursion of the Germans, he was murdered with his mother in an insurrection of his troops, headed by the brutal Maximin, who succeeded him as emperor.

**ALEXANDERS**, an umbelliferous biennial plant, a native of Britain, formerly cultivated for its leafstalks, which, having a pleasant aromatic flavor, were blanched and used instead of celery—a vegetable that has taken its place.

**ALEXANDRIA**, an ancient city and seaport in Egypt, at the northwest angle of the Nile delta, on a ridge of

land between the sea and Lake Mareotis. Founded by, and named in honor of, Alexander the Great, in B.C. 332, and the center of commerce between the east and west, as well as of Greek learning and civilization, with a population at one time of perhaps 1,000,000. It was especially celebrated for its great library, and its famous lighthouse, one of the wonders of the world, standing upon the little island of Pharos, which was connected with the city by a mole. Under Roman rule it was the second city of the empire, and when Constantinople became the capital of the east it still remained the chief center of trade; but it received a blow from which it never recovered when captured by Amru, general of Caliph Omar in 641, after a siege of fourteen months. Its ruin was finally completed by the discovery of the passage to India by the Cape of Good Hope, which opened up a new route for the Asiatic trade. See Alexandrian Library, Alexandrian School. —Modern Alexandria stands partly on what was formerly the island of Pharos, partly on the peninsula which now connects it with the mainland and has been formed by the accumulation of



soil, and partly on the mainland. Alexandria has two ports, on the east and west respectively of the isthmus of the Pharos peninsula, the latter having a breakwater over 3000 yards in length, with fine quays and suitable railway and other accommodation. The trade of Alexandria is large and varied, the exports being cotton, beans, peas, rice, wheat, etc.; the imports chiefly manufactured goods. At the beginning of the century Alexandria was an insignificant place of 5000 or 6000 inhabitants. The origin of its more recent career of prosperity it owes to Mohammed Ali. In 1882 the insurrection of Arabi Pasha and the massacre of Europeans led to the intervention of the British, and the bombardment of the forts by the British fleet in July. When the British entered the city they found the finest parts of it sacked and in flames, but the damage has been repaired. Pop. 319,766.

**ALEXANDRIA**, a town and port of the United States, in Virginia, on the right bank of the Potomac (which is of sufficient depth for large vessels), 7 miles south of Washington, with straight and spacious streets; carries on a considerable trade, chiefly in flour. Pop. 16,589.

**ALEXANDRIAN LIBRARY**, the largest and most famous of all the ancient collections of books, founded by Ptolemy Soter (died 283 B.C.), king of Egypt,

and greatly enlarged by succeeding Ptolemies. At its most flourishing period it is said to have numbered 700,000 volumes, accommodated in two different buildings, one of them being the Serapeion, or temple of Jupiter Serapis. The other collection was burned during Julius Caesar's siege of the city, but the Serapeion library existed to the time of the Emperor Theodosius the Great, when, at the general destruction of the heathen temples, the splendid temple of Jupiter Serapis was gutted (A.D. 391) by a fanatical crowd of Christians, and its literary treasures destroyed or scattered. A library was again accumulated, but was burned by the Arabs when they captured the city under the caliph Omar in 641.

**ALEXANDRIAN SCHOOL or AGE**, the school or period of Greek literature and learning that existed at Alexandria in Egypt during the three hundred years that the rule of the Ptolemies lasted (323-30 B.C.), and continued under the Roman supremacy. Ptolemy Soter founded the famous library of Alexandria (see above), and his son, Philadelphus, established a kind of academy of sciences and arts. Among the grammarians and critics were Zenodotus, Eratosthenes, Aristophanes, Aristarchus, and Zoilus, proverbial as a captious critic. Their merit is to have collected, edited, and preserved the existing monuments of Greek literature. To the poets belong Apollonius, Lycophron, Aratus, Nicander, Euphorion, Callimachus, Theocritus, Philetas, etc. Among those who pursued mathematics, physics, and astronomy, was Euclid, the father of scientific geometry; Archimedes, great in physics and mechanics; Apollonius of Perga, whose work on conic sections still exists; Nicomachus, the first scientific arithmetician; and (under the Romans) the astronomer and geographer Ptolemy. Alexandria also was distinguished in philosophical speculation, and it was here that the New Platonic school was established at the close of the second century after Christ by Ammonius of Alexandria (about 193 A.D.), whose disciples were Plotinus and Origen. The principal Gnostic systems also had their origin in Alexandria.

**ALEXANDRIAN VERSION, or CODEX ALEXANDRINUS**, a manuscript in the British Museum, of great importance in Biblical criticism, written on parchment with uncial letters, and belonging probably to the latter half of the sixth century. It contains the whole Greek Bible (the Old Testament being according to the Septuagint), together with the letters of Bishop Clement of Rome, but it wants parts of Matthew, John, and Second Corinthians. The Patriarch of Constantinople, who in 1628 sent this manuscript as a present to Charles I., said he had received it from Egypt (whence its name).

**ALEXANDRINE**, in prosody, the name given, from an old French poem on Alexander the Great, to a species of verse, which consists of six iambic feet, or twelve syllables, the pause being, in correct Alexandrines, always on the



sixth syllable; for example, the second of the following verses:

A needless Alexandrine ends the song.  
That, like a wounded snake, drags its slow  
length along.

In English Drayton's *Polyolbion* is written in this measure, and the concluding line of the Spenserian stanza is an Alexandrine. The French in their epics and dramas are confined to this verse, which for this reason is called by them the heroic.

**ALEX'IS MICHAI'LOVITCH** (son of Michael), second Russian czar of the line of Romanof (the present dynasty), born in 1629, succeeded his father Michael Feodorovitch in 1645, and died in 1676. He did much for the internal administration and for the enlargement of the empire; reconquered Little Russia from Poland, and carried his authority to the extreme east of Siberia. He was father of Peter the Great.

**ALEXIS PETRO'VITCH**, eldest son of Peter the Great, was born in Moscow, 1690, and died in 1718. He opposed the innovations introduced by his father, who on this account disinherited him by a ukase in 1718, and when he discovered that Alexis was paving the way to succeed to the crown he had his son tried and condemned to death. This affected the latter so much that he died in a few days, leaving a son, afterward the emperor Peter II.

**ALEX'IOS COMNE'NUS**, Byzantine Emperor, was born in 1048, and died in 1118. He was a nephew of Isaac the first emperor of the Comneni, and attained the throne in 1081, at a time when the empire was menaced from various sides, especially by the Turks and the Normans. From these dangers, as well as from later (caused by the first Crusade, the Normans, and the Turks), he managed to extricate himself by policy or warlike measures, and maintained his position till the age of seventy, during a reign of thirty-seven years.

**AL'FA**, a name for esparto grass or a variety of it, largely obtained from Algeria.

**ALFAL'FA**, a prolific forage plant similar to lucerne, largely grown in California, etc.

**AL'FENID**, an alloy of nickel plated with silver, used for spoons, forks, candlesticks, tea services, etc.

**ALFIERI** (ál-fē-ā-rē), Vittorio, Count, Italian poet, was born at Asti in 1749, and died in 1803. After extensive European travels he began to write, and his first play, *Cleopatra* (1775), being received with general applause he determined to devote all his efforts to attaining a position among writers of dramatic poetry. He died at Florence and was buried in the church of Santa Croce, between Machiavelli and Michael Angelo, where a beautiful monument by Canova covers his remains. His tragedies are full of lofty and patriotic sentiments, but the language is stiff and without poetic grace, and the plots poor. Nevertheless he is considered the first tragic writer of

Italy, and has served as a model for his successors.

**ALFON'SO**. See Alphonso.

**AL'FORD**, Henry, D.D., Dean of Canterbury, an English poet, scholar, and miscellaneous writer, was born in London in 1810. After attending various schools he entered Trinity College, Cambridge, in 1827, graduated B.A. in 1832, was elected fellow in 1834, and next year became vicar of Wymeswold, Leicestershire. In 1842 he was appointed examiner in logic and moral philosophy to the University of London, and held the appointment till 1857. He early began the great work of his life, his edition of the Greek Testament with commentary, which occupied him for twenty years, the first volume being published in 1849, the fourth and last in 1861. In 1853 he was transferred to Quebec Chapel, London, and in 1857 he was appointed Dean of Canterbury. He died in 1871.

**AL'FRED** (or **ÆL'FRED**) the Great, King of England, one of the most illustrious rulers on record, was born at Wantage, in Berkshire, A.D. 849, his father being Ethelwolf, son of Egbert, king of the West Saxons. He succeeded his brother Ethelred in 872, at a time when the Danes, or Northmen, had extended their conquests widely over the country, and they had completely overrun the kingdom of the West Saxons by 878. Alfred was obliged to flee in disguise, and stayed for some time with one of his own neat-herds. At length he gathered a small force, and, having fortified himself on the Isle of Athelney, formed by the confluence of the rivers Parret and Tone, amid the marshes of Somerset, he was able to make frequent sallies against the enemy. It was during his abode here that he went, if the story is true, disguised as a harper into the camp of King Guthrum (or Guthorm), and, having ascertained that the Danes felt themselves secure, hastened back to his troops, led them against the enemy, and gained such a decided victory that fourteen days afterward the Danes begged for peace. This battle took place in May, 878, near Edington, in Wiltshire. Alfred allowed the Danes who were already in the country to remain, on condition that they gave hostages, took a solemn oath to quit Wessex, and embraced Christianity. Their king, Guthrum, was baptized, with thirty of his followers, and ever afterward remained faithful to Alfred. They received that portion of the east of England now occupied by the counties of Norfolk, Suffolk, and Cambridge, as a place of residence. The few years of tranquillity (886-893) which followed were employed by Alfred in rebuilding the towns that had suffered most during the war, particularly London; in training his people in arms, and no less in agriculture; in improving the navy; in systematizing the laws and internal administration; and in literary labors and the advancement of learning. These peaceful labors were interrupted, about 894, by an invasion of the Northmen, who, after a struggle of three years, were finally driven out. Alfred died in 901. He had married, in 868, Alswith or Ealhswith, the daughter of a Mercian

nobleman, and left two sons: Edward, who succeeded him, and Ethelwerd, who died in 922.

**ALGÆ** (al'jē), a nat. order of cryptogamic or thallogamous plants, found for the most part in the sea and fresh water, and comprising seaweeds, etc. The higher forms have stems bearing leaf-like expansions, and they are often attached to the rocks by roots, which, however, do not derive nutriment from the rocks. A stem, however, is most frequently absent. The plants are nourished through their whole surface by the medium in which they live. They vary in size from the microscopic diatoms to forms whose stems resemble those of forest trees, and whose fronds rival the leaves of the palm. They are entirely composed of cellular tissue, and many are edible and nutritious, as carrageen or Irish-moss, dulse, etc. Kelp, iodine, and bromine are products of various species. The Algæ are also valuable as manure.

**ALGAROBILL'A**, the seed-pods of one or two South American trees, valuable as containing much tannin.

**AL'GAROT**, a violently purgative and emetic white powder, precipitated from chloride of antimony in water; formerly used in medicine.

**ALGARVE** (al-gár'vā), a maritime province of Portugal occupying the southern portion of the kingdom; mountainous but with some fertile tracts. Area, 2099 sq. miles; pop. 254,851.

**AL'GEBRA**, a kind of generalized arithmetic, in which numbers or quantities and operations, often also the results of operations, are represented by symbols. Thus the expression  $xy + cz + dy^2$  denotes that a number represented by  $x$  is to be multiplied by a number represented by  $y$ , a number  $c$  multiplied by a number  $z$ , a number  $d$  by a number  $y$  multiplied by itself (or squared), and the sum taken of these three products. So the equation (as it is called)  $x^2 - 7x + 12 = 0$  expresses the fact that if a certain number  $x$  is multiplied by itself, and this result made less by seven times the number and greater by twelve, the result is 0. In this case  $x$  must either be 3 or 4 to produce the given result; but such an equation (or formula) as  $(a+b)(a-b) = a^2 - b^2$  is always true whatever values may be assigned to  $a$  and  $b$ . Algebra is an invaluable instrument in intricate calculations of all kinds, and enables operations to be performed and results obtained that by arithmetic would be impossible, and its scope is still being extended.

The beginnings of algebraic method are to be found in Diophantus, a Greek of the fourth century of our era, but it was the Arabians that introduced algebra to Europe, and from them it received its name. The first Arabian treatise on algebra was published in the reign of the great Kaliph Al Mamun (813-833) by Mohammed Ben Musa. In 1202 Leonardo Fibonacci of Pisa, who had traveled and studied in the East, published a work treating of algebra as then understood in the Arabian school. From this time to the discovery of printing considerable attention was given to algebra, and the work of Ben



Musa and another Arabian treatise, called the Rule of Algebra, were translated into Italian. The first printed work treating on algebra (also on arithmetic, etc.) appeared at Venice in 1494, the author being a monk called Luca Pacioli da Bergamo. Rapid progress now began to be made, and among the names of those to whom advances are to be attributed are Tartaglia and Cardan. About the middle of the sixteenth century the German Stifel introduced the signs  $+$ ,  $-$ ,  $\sqrt{\phantom{x}}$ , and *Recorde* the sign  $=$ . *Recorde* wrote the first English work on algebra. François Vieta, a French mathematician (1540-1603), first adopted the method which has led to so great an extension of modern algebra, by being the first who used general symbols for known quantities as well as for unknown. It was he also who first made the application of algebra to geometry. Albert Girard extended the theory of equations by the supposition of imaginary quantities. The Englishman Harriot, early in the seventeenth century, discovered negative roots, and established the equality between the number of roots and the units in the degree of the equation. He also invented the signs  $<$ ,  $>$ , and Oughtthred that of  $\times$ . Descartes, though not the first to apply algebra to geometry, has, by the extent and importance of his applications, commonly acquired the credit of being so. The same discoveries have also been attributed to him as to Harriot, and their respective claims have caused much controversy. He obtained by means of algebra the definition and description of curves. Since his time Algebra has been applied so widely in geometry and higher mathematics that we need only mention the names of Fermat, Wallis, Newton, Leibnitz, De Moivre, MacLaurin, Taylor, Euler, D'Alembert, Lagrange, Laplace, Fourier, Poisson, Gauss, Honer, De Morgan, Sylvester, Cayley. Boole, Jevons, and others have applied the algebraic methods not only to formal logic but to political economy.

**ALGER**, Horatio, an American author, writer of juvenile books, born at Revere, Mass., 1834, died in 1899. He was graduated from Harvard in 1852, and, after studying divinity, became pastor of a Unitarian church at Brewster, Mass. Mr. Alger published over 70 stories, of which nearly 1,000,000 copies have been sold.

**ALGER**, Russell Alexander, American soldier and statesman, born at Lafayette, Ohio, in 1836. Admitted to the bar in 1859, he enlisted as a volunteer in the Union army at the outbreak of the civil war, and rose from the ranks to be major-general. After the war he grew rich as a lumber merchant in Michigan; was governor of Michigan from 1885 to 1886, commander of the G. A. R. in 1889, and secretary of war in President McKinley's Cabinet. He was appointed Senator in 1892, and elected in 1903 for term expiring in 1907. He died in 1907.

**ALGERIA**, a French colony in North Africa, having on the north the Mediterranean, on the east Tunis, on the west Morocco, and on the south (where the

boundary is ill-defined) the Desert of Sahara; area, 122,878 sq. miles, or, including the Algerian Sahara, 257,000. The country is divided into three departments—Algiers, Oran, and Constantine. The coast-line is about 550 miles in length, steep and rocky, and though the indentations are numerous the harbors are much exposed to the north wind. The country is traversed by the Atlas Mountains, two chains of which—the Great Atlas, bordering on the Sahara, and the Little, or Maritime Atlas, between it and the sea—run parallel to the coast, the former attaining a height of 7000 feet. The intervals are filled with lower ranges, and numerous transverse ranges connect the principal ones and run from them to the coast, forming elevated tablelands and inclosed valleys. The rivers are numerous, but many of them are mere torrents rising in the mountains near the coast. The Shelif is much the largest.

The chief products of cultivation are wheat, barley, and oats, tobacco, cotton, wine, silk, and dates. Among wild animals are the lion, panther, hyena, and jackal; the domestic quadrupeds include the horse, the mule, cattle, sheep, and pigs (introduced by the French). Algeria possesses valuable minerals, including iron, copper, lead, sulphur, zinc, antimony, marble (white and red), phosphate, and lithographic stone.

The two principal native races inhabiting Algeria are Arabs and Berbers. The former are mostly nomads, dwelling in tents and wandering from place to place, though a large number of them are settled in the Tell, where they carry on agriculture and have formed numerous villages. The Berbers, here called Kabyles, are the original inhabitants of the territory and still form a considerable part of the population. They speak the Berber language, but use Arabic characters in writing. The Jews form a small but influential part of the population. Various other races also exist. Except the Jews all the native races are Mohammedans. There are now a considerable number of French and other colonists, provision being made for granting them concessions of land on certain conditions. There are over 260,000 colonists of French origin in Algeria, and over 200,000 colonist natives of other European countries (chiefly Spaniards and Italians). Algeria is governed by a governor-general, who is assisted by a council appointed by the French government. The settled portion of the country, in the three departments of Algiers, Constantine, and Oran, is treated much as if it were a part of France, and each department sends two deputies and one senator to the French chambers. The rest of the territory is under military rule. The colony costs France a considerable sum every year. Pop. of Algeria proper in 1901, 4,739,331; of the Algerian Sahara, 60,000.

The country now called Algeria was known to the Romans as Numidia. It flourished greatly under their rule, and early received the Christian religion. It was conquered by the Vandals in 430-431 A.D., and recovered by Belisarius for the Byzantine Empire in

533-534. About the middle of the seventh century it was overrun by the Saracens. The town of Algiers was founded about 935 by Youssef Ibn Zeiri, and the country was subsequently ruled by his successors and the dynasties of the Almoravides and Almohades. The depredations of the Algerian pirates were a continual source of irritation to the Christian powers, who sent a long series of expeditions against them. For instance in 1815 a United States fleet defeated an Algerian one and forced the dey to agree to a peace in which he recognized the American flag as inviolable.

At last the French determined on more vigorous measures, and in 1830 sent a force of over 40,000 men against the country. Algiers was speedily occupied, the dey retired, and the country was without a government, but resistance was organized by Abd-el-Kader, an Arab chief whom the emergency had raised up.

This and subsequent efforts failed, and the country became a French province, with a French general for governor.

**ALGIERS** (al'jërz), a city and seaport on the Mediterranean, capital of Algeria, on the Bay of Algiers, partly on the slope of a hill facing the sea. The old town, which is the higher, is oriental



Principal mosque, Algiers.

in appearance, with narrow, crooked streets, and houses that are strong, prison-like edifices. The modern French town, which occupies the lower slope and spreads along the shore, is handsomely built, with broad streets and elegant squares. The climate of Algiers, though extremely variable, makes it a very desirable winter residence for invalids and others from colder regions. Though warm, it is bracing and tonic, and not of a relaxing character. There is a considerable rainfall (average 29 in.), but the dry air and absorbent soil prevent it from being disagreeable. The winter months resemble a bright, sunny American autumn, while the heat of summer is not so intense as that of Egypt. The sirocco or desert wind is troublesome, however, during summer, but in the winter it is merely a pleasant, warm, dry breeze. Hailstorms are not infrequent, but frost and snow in Algiers are so rare as to be almost unknown. Pop. 97,400.

**ALGIN**, a viscous, gummy substance obtained from certain seaweeds. It can be utilized for all purposes where starch or gum is required; used in



cookery for soups and jellies; in an insoluble form it can be cut, turned, and polished, like horn or vulcanite.

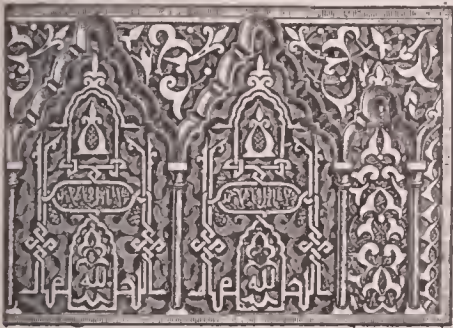
**ALGO'A BAY**, a bay on the south coast of Cape Colony, 425 miles east from the Cape of Good Hope, the only place of shelter on this coast for vessels during the prevailing northwest gales. The usual anchorage is off Port Elizabeth, on its west coast, now a place of large and increasing trade.

**ALGOL'**, a star in the constellation Perseus (head of Medusa), remarkable as a variable star, changing in brightness from the second to the fifth magnitude.

**ALGO'MA**, a district of Canada, on the north side of Lake Superior, forming the northwest portion of Ontario, rich in silver, copper, iron, etc.

**ALGON'QUINS**, a family of North American Indians, formerly spread over a great extent of territory, and still forming a large proportion of the Indians of Canada. They consisted of four groups, namely: (1) the eastern group, comprising the Massachusetts, Narragansets, Mohicans, Delawares, and other tribes; (2) the northeastern group, consisting of the Abenakis, etc.; (3) the western group, made up of the Shawnees, Miamis, Illinois, etc.; and (4) the northwestern group, including the Chippewas or Ojibbewas, the largest of all the tribes.

**ALHAM'BRA**, a famous group of buildings in Spain, forming the citadel of Granada when that city was one of the principal seats of the empire of the Moors in Spain, situated on a height, surround-



Alhambra—Moorish ornament.

ed by a wall flanked by many towers, and having a circuit of 2½ miles. Within the circuit of the walls are two churches, a number of mean houses, and some straggling gardens, besides the palace of Charles V. and the celebrated Moorish palace which is often distinctively spoken of as the Alhambra. This building, to which the celebrity of the site is entirely due, was the royal palace of the kings of Granada. The greater part of the present building belongs to the first half of the 14th century. It consists mainly of buildings surrounding two oblong courts, the one called the Court of the Fishpond (or of the Myrtles), 138 by 74 feet, lying north and south; the other, called the Court of the Lions, from a fountain ornamented with twelve lions in marble, 115 by 66 feet, lying east and west, described as being, with the apartments that surround it, "the gem of Arabian art in Spain, its most beautiful and most per-

fect example." Its design is elaborate, exhibiting a profusion of exquisite detail gorgeous in coloring, but the smallness of its size deprives it of the element of majesty. The peristyle or portico on each side is supported by 128 pillars of white marble, 11 feet high, sometimes placed singly and sometimes in groups. Two pavilions project into the court at each end, the domed roof of one having been lately restored. Some of the finest chambers of the Alhambra open into this court, and near the entrance a museum of Moorish remains has been formed. The prevalence of stucco or plaster ornamentation is one of the features of the Alhambra, which becomes especially remarkable in the beautiful honeycomb stalactitical pendentives which the ceilings exhibit. Arabesques and geometrical designs with interwoven inscriptions are present in the richest profusion.

**AL'IAS**, a word often used in judicial proceedings in connection with the different names that persons have assumed, most likely for prudential reasons, at different times, and in order to conceal identity, as Joseph Smith alias Thomas Jones.

**AL'IBI**, a defense in criminal procedure, by which the accused endeavors to prove that when the alleged crime was committed he was present in a different place.

**ALICANTE** (â-lê-kân'tâ), a fortified town and Mediterranean seaport in Spain, capital of the province of the same name, picturesquely situated partly on the slope of a hill, partly on the plain at the foot, about 80 miles south by west of Valencia. The principal manufactures are cotton, linen, and cigars, one cigar manufactory employing above 3000 women. The chief export is wine, which largely goes to England. Pop. 50,142.—The province is very fruitful and well cultivated, producing wine, silk, fruits, etc. The wine is of a dark color, and is heavy and sweet. Area, 2098 sq. miles. Pop. 470,149.

**ALICE MAUD MARY**, Princess, second daughter of Queen Victoria, Duchess of Saxony, and Grand Duchess of Hesse-Darmstadt, born 1843, died 1878. In 1862 she married Frederick William Louis of Hesse, nephew of the grand duke, whom he succeeded in 1877.

**A'LIEN**, in relation to any country, a person born out of the jurisdiction of the country, and not having acquired the full rights of a citizen of it. The position of aliens depends upon the laws of the respective countries, but generally speaking aliens owe a local allegiance, and are bound equally with natives to obey all general rules for the preservation of order which do not relate specially to citizens. In the United States the position of aliens as regards acquisition and holding of real property differs somewhat in the different states, though in recent times the disabilities of aliens have been removed in most of them. Personal property they can take, hold, and dispose of like native citizens. Individual states have no jurisdiction on the subject of naturalization, though they may pass laws admitting aliens to any privilege short of citizenship. A naturalized citizen

is not eligible to election as president or vice-president of the United States, and cannot serve as senator until after nine years' citizenship, nor as a member of the house of representatives until after seven years' citizenship. Five years' residence in the United States and one year's permanent residence in the particular state where the application is made are necessary for the attainment of citizenship.

**ALIGARH** (a-lê-gar'), a fort and town in India, in the United Provinces, on the East Indian railway, 84 miles southeast of Delhi. The fort, which had been skilfully strengthened by French engineers in the service of the Mahrattas, was taken by storm after a desperate resistance in 1803 by the British forces under Lord Lake, when the whole district was added to the British possessions. Pop. 70,127.—The district has an area of 1954 square miles, and a population of 1,203,047.

**ALIGNMENT** (a-lin'ment), a military term, signifying the act of adjusting to a straight line or in regular straight lines, or the state of being so adjusted.

**AL'IMENT**, food, a term which includes everything, solid or liquid, serving as nutriment for the bodily system. Aliments are of the most diverse character, but all of them must contain nutritious matter of some kind, which, being extracted by the act of digestion, enters the blood, and effects by assimilation the repair of the body. Alimentary matter, therefore, must be similar to animal substance, or transmutable into such. All alimentary substances must, therefore, be composed in a greater or lesser degree of soluble parts, which easily lose their peculiar qualities in the process of digestion, and correspond to the elements of the body. The articles used as food by man do not consist entirely of nutritious substances, but with few exceptions are compounds of various nutritious with indigestible and accordingly innutritious substances. The only nitrogenous aliments are albuminous substances, and these are contained largely in animal food (flesh, eggs, milk, cheese). The principal non-nitrogenous substance obtained as food from animals is fat. Sugar is so obtained in smaller quantities (in milk). While some vegetable substances also contain much albumen, very many of them are rich in starch. Among vegetable substances the richest in albumen are the legumes (peas, beans, and lentils), and following them come the cereals (wheat, oats, etc.). Sugar, water, and salts may pass without any change into the circulatory system; but albuminous substances cannot do so without first being rendered soluble and capable of absorption (in the stomach and intestines); starch must be converted into sugar and fat emulsified (chiefly by the action of the pancreatic juice). One of the objects of cooking is to make our food more susceptible of the operation of the digestive fluids.

The relative importance of the various nutritious substances that are taken into the system and enter the blood depends upon their chemical consti-



tution. The albuminous substances are the most indispensable, inasmuch as they form the material by which the constant waste of the body is repaired. But a part of the operation of albuminous nutriment may be performed equally well, and at less cost, by non-nitrogenous substances, that part being the maintenance of the temperature of the body. As is well known, the temperature of warm-blooded animals is considerably higher than the ordinary temperature of the surrounding air, in man about 98° Fahr., and the uniformity of this temperature is maintained by the heat which is set free by the chemical processes (of oxidation) which go on within the body. Now these processes take place as well with non-nitrogenous as with nitrogenous substances. The former are even preferable to the latter for the keeping up of these processes; by oxidation they yield larger quantities of heat with less labor to the body, and they are hence called the heat-givers. The best heat-giver is fat. Albuminous matters are not only the tissue-formers of the body; they also supply the vehicle for the oxygen, inasmuch as it is of such matters that the blood corpuscles are formed. The more red blood corpuscles an animal possesses, the more oxygen can it take into its system, and the more easily and rapidly can it carry on the process of oxidation and develop heat. Now only a part of the heat so developed passes away into the environment of the animal; another part is transformed within the body (in the muscles) into mechanical work. Hence it follows that the non-nitrogenous articles of food produce not merely heat but also work, but only with the assistance of albuminous matters, which, on the one hand, compose the working machine, and, on the other hand, convey the oxygen necessary for oxidation. See Dietetics, Digestion, Adulteration, etc.

**ALIMENTARY CANAL**, a common name given to the œsophagus, stomach, and intestines of animals. See Intestine, Stomach.

**AL'IMONY**, in law, the allowance to which a woman is entitled while a matrimonial suit is pending between her and her husband, or after a legal separation from her husband, not occasioned by adultery or elopement on her part.

**AL'QUOT PART** is such part of a number as will divide and measure it exactly without any remainder. For instance, 2 is an aliquot part of 4, 3 of 12, and 4 of 20.

**ALISMA'CEÆ**, the water-plantain family, the members of which are herbaceous, annual, or perennial. They are floating or marsh plants, and many have edible fleshy rhizomes. They are found in all countries, but especially in Europe and North America, where their rather brilliant flowers adorn the pools and streams.

**AL'ISON**, Sir Archibald, lawyer and writer of history, was born in Shropshire in 1792, and died in 1867, near Glasgow. He was made a baronet in 1852. His chief work—*The History of Europe*, from 1789 to 1815—was first issued in

ten vols. 1833-42, the narrative being subsequently brought down to 1852, the beginning of the second French Empire. This work displays industry and research, and is generally accurate, but not very readable. Its popularity, however, has been immense, and it has been translated into French, German, Arabic, Hindustani, etc.

His son, General Sir Archibald Alison, born in 1826, entered the army in 1846, and served in the Crimea, in India during the mutiny, and in the Ashantee expedition of 1873-4. In Egypt, in 1882, he led the Highland Brigade at the battle of Tel-el-Kebir, and in 1882-3 remained in command of the army of occupation. He retired from the army in 1893.

**ALIZ'ARINE**, a substance contained in the madder root, and largely used in dyeing reds of various shades. It forms yellowish-red prismatic crystals, nearly insoluble in cold, but dissolved to a small extent by boiling water, and readily soluble in alcohol and ether. It possesses exceedingly strong tinctorial powers.

**AL'KALI**, a term first used to designate the soluble part of the ashes of plants, especially of seaweed. Now the term is applied to various classes of bodies having the following properties in common: (1) solubility in water; (2) the power of neutralizing acids, and forming salts with them; (3) the property of corroding animal and vegetable substances; (4) the property of altering the tint of many coloring matters—thus, they turn litmus, reddened by an acid, into blue; turmeric, brown; and syrup of violets and infusion of red cabbages, green. The alkalies are hydrates, or water in which half the hydrogen is replaced by a metal or compound radical. In its restricted and common sense the term is applied to four substances only: hydrate of potassium (potash), hydrate of sodium (soda), hydrate of lithium (lithia), and hydrate of ammonium (an aqueous solution of ammonia). In a more general sense it is applied to the hydrates of the so-called alkaline earths (baryta, strontia, and lime), and to a large number of organic substances, both natural and artificial, described under Alkaloid.—Volatile alkali is a name for ammonia.

**ALKALIM'ETER**, an instrument for ascertaining the quantity of free alkali in any impure specimen, as in the potashes of commerce. These, besides the carbonate of potash, of which they principally consist, usually contain a portion of foreign salts, as sulphate and chloride of potassium, and as the true worth of the substance, or price for which it ought to sell, depends entirely on the quantity of carbonate, it is of importance to be able to measure it accurately by some easy process. This process depends on the neutralization of the alkali by an acid of known strength, the point of neutralization being determined by the fact that neutral liquids are without action on either red or blue litmus solution. The alkalimeter is merely a graduated tube furnished with a stop-cock at the lower extremity, from which the standard acid is dropped

into water in which a certain quantity of the substance is dissolved. The quantity required to produce neutralization being noted, the strength of the liquid tested is easily arrived at. A process of neutralization, exactly the same in principle, may be employed to test the strength of acids by alkalies, the one process being called alkalimetry, the other acidimetry.

**AL'KALOID**, a term applied to a class of nitrogenized compounds having certain alkaline properties, found in living plants, and containing their active principles, usually in combination with organic acids. Their names generally end in ine, as morphine, quinine, aconitine, caffeine, etc. Most alkaloids occur in plants, but some are formed by decomposition. Their alkaline character depends on the nitrogen they contain. Most natural alkaloids contain carbon, hydrogen, nitrogen, and oxygen, but the greater number of artificial ones want the oxygen. The only property common to all alkaloids is that of combining with acids to form salts, and some exhibit an alkaline reaction with colors. Alkaloids form what is termed the organic bases of plants. Although formed originally within the plant, it has been found possible to prepare several of these alkaloids by purely artificial means.

**AL'KANET**, a dyeing drug, the bark of the root of a plant with downy and spear-shaped leaves, and clusters of small purple or reddish flowers. The plant is sometimes cultivated in Britain, but most of the alkanet of commerce is imported from the Levant or from southern France. It imparts a fine deep-red color to all unctuous substances, and is used for coloring oils, plasters, lip-salve, confections, etc.; also in compositions for rubbing and giving color to mahogany furniture, and to color spurious port-wine.

**ALKAR'SIN**, an extremely poisonous liquid containing kakodyle, together with oxidation products of this substance, and formerly known as Cadet's fuming liquor, characterized by its insupportable smell and high degree of spontaneous combustibility when exposed to air.

**ALKO'RAN**. See Koran.

**ALLA BREVE** (brā'vā), a musical direction expressing that a breve is to be played as fast as a semibreve, a semibreve as fast as a minim, and so on.

**AL'LAH**, in Arabic, the name of God, a word of kindred origin with the Hebrew word Elohim. Allah Akbar (God is great) is a Mohammedan war-cry.

**ALLAHABAD'**, an ancient city of India, capital of the United Provinces, on the wedge of land formed by the Jumna and the Ganges. Allahabad is one of the chief resorts of Hindu pilgrims, who have their sins washed away by bathing in the waters of the sacred rivers Ganges and Jumna at their junction; and is also the scene of a great fair in December and January. Pop. 172,032.—The division of Allahabad contains the districts of Cawnpur, Futtehpur, Hamirpur, Banda, Jaunpur, and Allahabad; area, 17,265 square miles; pop. 5,535,803.—The district contains an area of 2852 square miles,



about five-sixths being under cultivation. Pop. 1,487,904.

**ALLAMANDA**, a genus of American tropical plants with large yellow or violet flowers, some of them met with in European greenhouses. *A. cathartica* has strong emetic and purgative properties.

**ALLAN**, David, a Scottish painter, born 1744, died 1796. His illustrations of the Gentle Shepherd, the Cotter's Saturday Night, and other sketches of rustic life and manners in Scotland, obtained for him the name of the "Scottish Hogarth."

**ALLAN**, Sir William, a distinguished Scottish artist, born in 1782, died in 1850. In 1814 he publicly exhibited his pictures, one of which (Circassian Captives) made his reputation. He now turned his attention to historical painting and battle scenes, among them being two pictures of the Battle of Waterloo, the one from the British, the other from the French position, and delineating the actual scene and the incidents therein taking place at the moment chosen for the representation. One of these Waterloo pictures was purchased by the Duke of Wellington. In 1835 he became R.A., in 1838 president of the Scottish Academy, in 1842 he was knighted.

**ALLAN'TOIS**, a structure appearing during the early development of vertebrate animals—Reptiles, Birds, and Mammalia. It is largely made up of blood-vessels, and, especially in birds, attains a large size. It forms the inner lining to the shell, and may thus be viewed as the surface by means of which the respiration of the embryo is carried on. In Mammalia the allantois is not so largely developed as in Birds, and it enters largely into the formation of the placenta.

**ALLEGHANY** (al-le-gā'ni), a river of Pennsylvania and New York, which unites with the Monongahela at Pittsburgh to form the Ohio; navigable nearly 200 miles above Pittsburgh.

**ALLEGHANY MOUNTAINS**, a name sometimes used as synonymous with Appalachians, but also often restricted to the portion of those mountains that traverses the states of Virginia, Maryland, and Pennsylvania from southwest to northeast, and consists of a series of parallel ridges for the most part wooded to the summit, and with some fertile valleys between. Their mean elevation is about 2500 feet; but in Virginia they rise to over 4000.

**ALLEGHENY** (al-le-gen'i), a city of the United States, in Pennsylvania, on the river Alleghany, opposite Pittsburgh, of which it may be considered virtually to be a suburb, and with which it is connected by six bridges. The principal industries are connected with iron and machinery. Pop. 160,000.

**ALLE'GIANCE**, the obedience which every subject or citizen owes to the government of his country. It used to be the doctrine of the English law that natural-born subjects owe an allegiance which is intrinsic and perpetual, and which cannot be divested by any act of their own; but this is no longer the case. Aliens owe a temporary or local allegiance to the government under which they for the time reside.

**AL'LEGORY**, a figurative representation in which the signs (words or forms) signify something besides their literal or direct meaning. In rhetoric allegory is often but a continued simile. Parables and fables are a species of allegory. Sometimes long works are throughout allegorical, as Spenser's *Faerie Queene* and Bunyan's *Pilgrim's Progress*. When an allegory is thus continued it is indispensable to its success that not only the allegorical meaning should be appropriate, but that the story should have an interest of its own in the direct meaning apart from the allegorical signification. Allegory is often made use of in painting and sculpture as well as in literature.

**ALLEGRO** (ál-lā'grō), a musical term expressing a more or less quick rate of movement, or a piece of music or movement in lively time. Allegro moderato, moderately quick; allegro maestoso, quick but with dignity; allegro assai and allegro molto, very quick; allegro con brio or con fuoco, with fire and energy; allegro, with the utmost rapidity.

**ALLELUIA**. See Halleluia.

**ALLEN**, Charles Herbert, American statesman, born at Lowell, Mass., in 1848. He was successively member of the Massachusetts legislature, of the state senate, and of the 49th and 50th congresses. In 1898 he became assistant secretary of the Navy, and 1900-1 was the first civil governor of Porto Rico.

**ALLEN**, Ethan, an American revolutionary partisan and general; born 1737, died 1789. He surprised and



Ethan Allen.

captured Ticonderoga Fort (1775); attacked Montreal, and was captured and sent to England, being exchanged in 1778.

**ALLEN**, James Lane, an American novelist, born in Kentucky in 1849, graduated from Transylvania University, and former educator. In 1886 he began to publish novels dealing with various social and religious topics. Among these may be mentioned *Flute and Violin*, *The Blue Grass Region*, *John Gray*, *The Kentucky Cardinal*, and *The Reign of Law*. His works show considerable power of style.

**ALLEN**, Viola, an American actress, born in 1867. She made her debut in Esmeralda at the Madison Square Theater in New York in 1882. She subsequently played in the companies of McCullough, Salvini, Barrett, Jefferson, Florence, and others, but her chief success was in the rôle of Glory Quayle in Hall Caine's *Christian*.

**ALLEN**, William, cardinal, an English Roman Catholic of the time of

Queen Elizabeth, a strenuous opponent of Protestantism and supporter of the claims of Philip II. to the English throne; born 1532, died 1594. It was by his efforts that the English college for Catholics at Douay was established. He was made cardinal in 1587.

**ALLEN**, William, D.D., American clergyman and author; born 1784, died 1868. He was president of Bowdoin College 1820-1839; author of *American Biographical and Historical Dictionary*.

**ALLEN**, Zechariah, an American inventor, born in Providence, R. I., in 1795, died in 1882. He invented the first hot-air furnace for heating dwellings, calculated the power of Niagara Falls, and invented the cut-off valve for steam engines.

**ALLENTOWN**, a town in Pennsylvania, on the Lehigh river, 8 miles above its junction with the Delaware. It has an important trade in coal and iron ore, with large blast-furnaces, rolling-mills, etc. Pop. 40,000.

**ALLIA'CEOUS PLANTS**, plants belonging to the genus to which the onion, leek, garlic, shallot, etc., belong, or to other allied genera, and distinguished by a certain peculiar pungent smell and taste.

**ALLI'ANCE**, a league between two or more powers. Alliances are divided into offensive and defensive. The former are for the purpose of attacking a common enemy, and the latter for mutual defense. An alliance often unites both of these conditions. Offensive alliances, of course, are usually directed against some particular enemy; defensive alliances against any one from whom an attack may come.

**ALLIANCE**, Holy. See Holy Alliance.

**AL'LIBONE**, Samuel Austin, LL.D., American author; born 1816, died 1889. He compiled a most useful *Critical Dictionary of English Literature and British and American Authors*.

**ALLIER** (ál-lē-ā), a central department of France, intersected by the river Allier, and partly bounded by the Loire; surface diversified by offsets of the Cevennes and other ranges, rising in the south to over 4000 feet, and in general richly wooded. It has extensive beds of coal as well as other minerals; mineral waters at Vichy, Bourbon, L'Archambault, etc. Area, 2822 sq. miles. Capital, Moulins. Pop. 424,582.

**AL'LIGATOR**, a genus of reptiles, differing from the true crocodiles in having a shorter and flatter head, in having cavities or pits in the upper jaw, into which the long canine teeth of the under jaw fit, and in having the feet much less webbed. Their habits are less perfectly aquatic. They are confined to the warmer parts of America, where they frequent swamps and marshes, and may be seen basking on the dry ground during the day in the heat of the sun. They are most active during the night, when they make a loud bellowing. The largest of these animals grow to the length of 18 or 20 feet. They are covered by a dense armor of horny scales, impenetrable to a rifle-ball, and have a huge mouth, armed with strong, conical teeth. They swim with wonderful celerity, impelled by their long, laterally-compressed, and powerful tails. On



land their motions are proportionally slow and embarrassed because of the length and unwieldiness of their bodies and the shortness of their limbs. They live on fish, and any small animals or carrion, and sometimes catch pigs on

on important occasions made by the pope to the cardinals.

**ALLOP'ATHY**, the name applied by homœopaths to systems of medicine other than their own; Hahnemann's principle being that "like cures like," he



Group of Alligators.

the shore, or dogs which are swimming. They even sometimes make man their prey. In winter they burrow in the mud of swamps and marshes, lying torpid till the warm weather. The female lays a great number of eggs, which are deposited in the sand or mud, and left to be hatched by the heat of the sun, but the mother alligator is very attentive to her young. The most fierce and dangerous species is that found in the southern parts of the United States, having the snout a little turned up, slightly resembling that of the pike. The alligators of South America are there very often called Caymans.

**ALLIGATOR-APPLE**, a fruit allied to the custard-apple, growing in marshy districts in Jamaica, little eaten on account of its narcotic properties.

**ALLIGATOR-PEAR**, an evergreen tree with a fruit resembling a large pear, 1 to 2 lbs. in weight, with a firm marrow-like pulp of a delicate flavor; called also avocado-pear, or subaltern's butter. It is a native of tropical America and the West Indies.

**ALLISON**, William Boyd, an American statesman born at Perry, Ohio, educated at Western Reserve College, and removed as a lawyer to Iowa in 1857. He was member of congress from 1863 to 1871, and has been U. S. senator since 1872. He originated the Bland-Allison act of 1878, was member of the Brussels Conference of 1892, and in the national republican convention of 1880 figured as a candidate for the presidency. He died in 1908.

**ALLITERA'TION**, the repetition of the same letter at the beginning of two or more words immediately succeeding each other, or at short intervals; as, many men many minds; death defies the doctor; apt alliteration's artful aid; puffs, powders, patches, bibles, billet-doux.

**AL'LIUM**, a genus of plants containing numerous well-known species of pot-herbs. They are umbelliferous, and mostly perennial, herbaceous plants, but a few are biennial. Among them are garlic, onion, leek, chive, shallot.

**ALLOCU'TION**, an address, a term particularly applied to certain addresses

called his own system homœopathy, and other systems allopathy. See Homœopathy.

**ALLOT'ROPY**, a term used to express the fact that one and the same element may exist in different forms, differing widely in external physical properties. Thus, carbon occurs as the diamond, and as charcoal and plumbago, and is therefore regarded as a substance subject to allotropy.

**ALLOY'**, a substance produced by melting together two or more metals, sometimes a definite chemical compound, but more generally merely a mechanical mixture. Most metals mix together in all proportions, but others unite only in definite proportions, and form true chemical compounds. Others again resist combination, and when fused together form not a homogeneous mixture, but a conglomerate of distinct masses. The changes produced in their physical properties by the combination of metals are very various. Their hardness is in general increased, their malleability and ductility impaired. The color of an alloy may be scarcely different from that of one of its components, or it may show traces of neither of two. Its specific gravity is sometimes less than the mean of that of its component metals. Alloys are always more fusible than the metal most difficult to melt that enters into their composition, and generally even more so than the most easily melted one. Newton's fusible metal, composed of three parts of tin, two or five parts of lead, and five or eight parts of bismuth, melts at temperatures varying from 198° to 210° F. (and therefore in boiling water); its components fuse respectively at the temperatures 442°, 600°, and 478° F. Sometimes each metal retains its own fusing-point. With few exceptions metals are not much used in a pure state. Gold coins contain 8½ per cent alloy; silver coins, 7½ per cent. Printers' types are made from an alloy of lead and antimony; brass and a numerous list of other alloys are formed from copper and zinc; bronze from copper and tin.

**ALL SAINTS' DAY**, a festival of the Christian Church, instituted in 835, and

celebrated on the 1st of November in honor of the saints in general.

**ALL SOULS' DAY**, a festival of the Roman Catholic Church, instituted in 998, and observed on the 2d of November for the relief of souls in purgatory.

**ALLSPICE** (al'spīs), or **PIMENTA**, is the dried berry of a West Indian species of myrtle, a beautiful tree with white and fragrant aromatic flowers and leaves of a deep shining green. It is employed in cookery, also in medicine as an agreeable aromatic, and forms the basis of a distilled water, a spirit, and an essential oil.

**ALLU'VIUM**, deposits of soil collected by the action of water, such as are found in valleys and plains, consisting of loam, clay, gravel, etc., washed down from the higher grounds. Great alterations are often produced by alluvium—deltas and whole islands being often formed by this cause. Much of the rich land along the banks of rivers is alluvial in its origin.

**AL'MADEN**, a place in California, about 60 m. s.e. of San Francisco, with rich quicksilver mines, the product of which has been largely employed in gold and silver mining.

**AL'MA MA'TER**, a term familiarly applied to their own university by those who have had a university education.

**AL-MAMUN** (ma-mōn'), a caliph of the Abbasside dynasty, son of Harun-al-Rashid, born 786, died 833. Under him Bagdad became a great center of art and science.

**AL'MANAC**, a calendar, in which are set down the rising and setting of the sun, the phases of the moon, the most remarkable positions and phenomena of the heavenly bodies, for every month and day of the year; also the several fasts and feasts to be observed in the church and state, etc., and often much miscellaneous information likely to be useful to the public. The term is of Arabic origin, but the Arabs were not the first to use almanacs, which indeed existed from remote ages. In England they are known from the fourteenth century, there being several English almanacs of this century existing in MS. They became generally used in Europe within a short time after the invention of printing; and they were very early remarkable, as some are still, for the mixture of truth and falsehood which they contained. Almanacs, from their periodical character, and the frequency with which they are referred to, are now more and more used as vehicles for conveying statistical and other useful information, some being intended for the inhabitants of a particular country or district, others for a particular class or party. Some of the almanacs that are regularly published every year are extremely useful, and are indeed almost indispensable to men engaged in official, mercantile, literary, or professional business.

**ALMA - TAD'EMA**, Sir Lawrence, Dutch painter, born in 1836, resident since 1870 in England, where he is a naturalized subject. In 1876 he was elected an associate of the Royal Academy, in 1879 an academician. He received the honor of knighthood in 1899. He is especially celebrated for his



## ALMERIA

pictures of ancient Roman, Greek, and Egyptian life, which are painted with great realism and archaeological correctness.

**ALMERIA** (ál-mā-rē'á), a fortified seaport of southern Spain, capital of province Almeria, near the mouth of a river and on the gulf of same name. The province, which has an area of 3300 sq. miles, is generally mountainous, and rich in minerals. Pop. of town, 47,326; of province, 359,013.

**ALMOND** (á'mund), the fruit of the almond-tree, which grows usually to the height of 20 feet, and is akin to the peach, nectarine, etc. It has beautiful pinkish flowers that appear before the



Almond.

leaves, which are oval, pointed, and delicately serrated. It is a native of Africa and Asia. The fruit is a drupe, ovoid, and with downy outer surface; the fleshy covering is tough and fibrous; it covers the compressed wrinkled stone inclosing the seed or almond within it. There are two varieties, one sweet and the other bitter. The chief kinds of sweet almonds are the Valencian, Jordan, and Malaga. They contain a bland fixed oil, consisting chiefly of olein. Bitter almonds come from Mogador, and besides a fixed oil they contain a substance called emulsin, and also a bitter crystalline substance called amygdalin, which, acting on the emulsin, produces prussic acid, whence the aroma of bitter almonds when mixed with water. Almond-oil, a bland fixed oil, is expressed from the kernels of either sweet or bitter almonds, and is used by perfumers and in medicine. A poisonous essential oil is obtained from bitter almonds, which is used for flavoring by cooks and confectioners, also by perfumers and in medicine. The name almond, with a qualifying word prefixed, is also given to the seeds of other species of plants; thus, Java almonds are the kernels of *Canarium commune*.

**AL'MONER**, an officer of a religious establishment to whom belonged the distribution of alms. The grand almoner (grand aumônier) of France was the highest ecclesiastical dignitary in that kingdom before the revolution. The lord almoner, or lord high almoner, of England, is generally a bishop, whose office is well-nigh a sinecure. He distributes the sovereign's doles to the poor on Maundy Thursday.

**AL'MUG** (or **AL'GUM**) **TREE**, names which occur in 1 Ki. x. 11, 12 and 2 Chr. ii. 8, and ix. 10, 11, as the names of trees

of which the wood was used for pillars in the temple and the king's house, for harps and psalteries, etc. They are said in one passage to be hewn in Lebanon, in another to be brought from Ophir. They have been identified by critics with the red sandalwood of India. Some of them may possibly have been transplanted to Lebanon by the Phœnicians.

**ALOE** (al'ō), the name of a number of plants belonging to the genus *Aloë*, some of which are not more than a few inches, while others are 30 feet and upward in height; natives of Africa and other hot regions; leaves fleshy, thick, and more or less spinous at the edges or extremity; flowers with a tubular corolla. Some of the larger kinds are of great use, the fibrous parts of the leaves being made into cordage, fishing nets and lines, cloth, etc. The inspissated juice of several species is used in medicine, under the name of aloes, forming a bitter purgative. The American aloe (see *Agave*) is a different plant altogether.

**ALOES-WOOD**, the inner portion of the trunk of forest trees found in tropical Asia, and yielding a fragrant resinous substance, which, as well as the wood, is burned for its perfume.

**ALPACA**, a ruminant mammal of the camel tribe, a native of the Andes, especially of the mountains of Chile and Peru, and so closely allied to the llama that by some it is regarded rather as a smaller variety than a distinct species. It has been domesticated, and remains also in a wild state. In form and size it approaches the sheep, but has a longer neck. It is valued chiefly for its long, soft, and silky wool, which is straighter than that of the sheep, and very strong, and is woven into fabrics of great beauty, used for shawls, clothing for warm climates, coat-linings, and umbrellas, and known by the same name. Its flesh is pleasant and wholesome.

**ALPENHORN**, a long, nearly straight horn, curving slightly, and widening toward its extremity, used in the Alps to convey signals, or notice of something.

**ALPENSTOCK**, a strong tall stick shod with iron, pointed at the end so as to take hold in, and give support on, ice and other dangerous places in climbing the Alps and other high mountains.

**ALPE'NA**, a city and the county seat of Alpena Co., Mich., 110 miles north of Bay City, on Thunder Bay, and the Detroit and Mackinaw Railroad. Pop. 13,100.

**ALPES** (álp), the name of three departments in the southeast of France, all more or less covered by the Alps or their offshoots: Basses-Alpes (bäs-álp) has mountains rising to a height of 8000 to 10,000 feet, is drained by the Durance and its tributaries, and is the most thinly peopled department in France; area, 2685 miles; capital, Digne. Pop. 129,494.

—**Hautes-Alpes** (öt-álp), mostly formed out of ancient Dauphiné, traversed by the Cottian and Dauphiné Alps (highest summits 12,000 ft.), drained chiefly by the Durance and its tributaries. It is the lowest department in France in point of absolute population; area, 2158 miles; capital, Gap; pop. 122,924. — **Alpes-Maritimes** (álp-má-ri-tēm) has the

## ALPHABET

Mediterranean on the south, and mainly consists of the territory of Nice, ceded to France by Italy in 1860. The greater part of the surface is covered by the Maritime Alps; the principal river is the Var. It produces in the south cereals, vines, olives, oranges, citrons, and other fruits; and there are manufactories of perfumes, liquors, soap, etc., and valuable fisheries. It is a favorite resort for invalids. Area, 1482 square miles; capital, Nice; pop. 293,213.

**AL'PHA** and **O'MEGA**, the first and last letters of the Greek alphabet, some-



Alpaca.

times used to signify the beginning and the end, or the first and the last of anything; also as a symbol of the Divine Being. They were also formerly the symbol of Christianity, and engraved accordingly on the tombs of the ancient Christians.

**AL'PHABET** (from Alpha and Beta, the two first letters of the Greek alphabet), the series of characters used in writing a language, and intended to represent the sounds of which it consists. The English alphabet, like most of those of modern Europe, is derived directly from the Latin, the Latin from the ancient Greek, and that from the Phœnician, which again is believed to have had its origin in the Egyptian hieroglyphics, the Hebrew alphabet also having the same origin. The names of the letters in Phœnician and Hebrew must have been almost the same, for the Greek names, which, with the letters, were borrowed from the former, differ little from the Hebrew. By means of the names we may trace the process by which the Egyptian characters were transformed into letters by the Phœnicians. Some Egyptian character would, by its form, recall the idea of a house, for example, in Phœnician or Hebrew beth. This character would subsequently come to be used wherever the sound b occurred. Its form might be afterward simplified, or even completely modified, but the name would still remain, as beth still continued the Hebrew name for b, and beta the Greek. Our letter m, which in Hebrew was called mim, water, has still a considerable resemblance to the zigzag, wavy line which had been chosen to represent water, as in the zodiacal symbol for Aquarius. The letter o, of which the Hebrew name means eye, no doubt originally intended to represent that



organ. While the ancient Greek alphabet gave rise to the ordinary Greek alphabet and the Latin, the Greek alphabet of later times furnished elements for the Coptic, the Gothic, and the old Slavic alphabets. The Latin characters are now employed by a great many nations, such as the Italians, the French, the Spanish, the Portuguese, the English, the Dutch, the German, the Hungarian, the Polish, etc., each nation having introduced such modifications or additions as are necessary to express the sound of the language peculiar to it. The Greek alphabet originally possessed only sixteen letters, though the Phœnician had twenty-two. The original Latin alphabet, as it is found in the oldest inscriptions consisted of twenty-one letters; namely, the vowels a, e, i, o, and u, (v) and the consonants b, c, d, f, h, k, l, m, n, p, q, r, s, t, x, z. The Anglo-Saxon alphabet had two characters for the digraph *th*, which were unfortunately not retained in later English; it had also the character *æ*. It wanted j, v, y (consonant), and z. The German alphabet consists of the same letters as the English, but the sounds of some of them are different. Anciently certain characters called Runic were made use of by the Teutonic nations, to which some would attribute an origin independent of the Greek and Latin alphabets. While the alphabets of the west of Europe are derived from the Latin, the Russian, which is very complete, is based on the Greek, with some characters borrowed from the Armenian, etc. Among Asiatic alphabets, the Arabian (ultimately of Phœnician origin) has played a part analogous to that of the Latin in Europe, the conquests of Mohammedanism having imposed it on the Persian, the Turkish, the Hindustani, etc. The Sanskrit or Devanagari alphabet is one of the most remarkable alphabets of the world. As now used it has fourteen characters for the vowels and diphthongs, and thirty-three for the consonants, besides two other symbols. Our alphabet is a very imperfect instrument for what it has to perform, being both defective and redundant. An alphabet is not essential to the writing of a language, since ideograms or symbols may be used instead, as in Chinese.

**ALPHONSO**, the name of a number of kings of Spain and Portugal. Alphonso I. was the son of Henry of Burgundy. He conquered Portugal and was recognized by the Pope. The present King of Spain is Alphonso XIII., born May 17, 1886, six months after the death of his father, married 1906, to Princess Victoria of England. In 1907 an heir to the throne was born.

**ALPIEE WARBLER**, a European bird of the same genus as the hedge-sparrow.

**ALPS**, the highest and most extensive system of mountains in Europe, included between lat. 44° and 48° n., and lon. 5° and 18° e., covering a great part of Northern Italy, several departments of France, nearly the whole of Switzerland, and a large part of Austria, while its extensive ramifications connect it with nearly all the mountain systems of Europe. The culminating peak is Mont Blanc, 15,781 feet high, though the

true center is the St. Gothard, or the mountain mass to which it belongs, and from whose slopes flow, either directly or by affluents the great rivers of central Europe, the Danube, Rhine, Rhone, and Po. Round the northern frontier of Italy the Alps form a remarkable barrier, shutting it off at all points from the main land of Europe, so that, as a rule, it can only be approached from France, Germany, or Switzerland, through high and difficult passes. In the west this barrier approaches close to the Mediterranean coast, and near Nice there is left a free passage into the Italian peninsula between the mountains and the sea. From this point eastward the chain proceeds along the coast till it forms a junction with the Apennines. In the opposite direction it proceeds northwest, and afterward north to Mont Blanc, on the boundaries of France and Italy; it then turns northeast and runs generally in this direction to the Gross Glockner, in central Tyrol, between the rivers Drave and the Salza, where it divides into two branches, the northern proceeding northeast toward Vienna, the southern toward the Balkan Peninsula. The principal valleys of the Alps run mostly in a direction nearly parallel with the principal ranges, and therefore east and west. The transverse valleys are commonly shorter, and frequently lead up through a narrow gorge to a depression in the main ridge between two adjacent peaks. These are the passes or cols, which may usually be found by tracing a stream which descends from the mountains up to its source.

The Alps are very rich in lakes and streams. Among the chief of the former are the lakes of Geneva, Constance, Zurich, Thun, Brienz, on the north side; on the south Maggiore, Como, Lugano, Garda, etc. The drainage is carried to the North Sea by the Rhine, to the Mediterranean by the Rhone, to the Adriatic by the Po, to the Black Sea by the Danube.

In the lower valleys of the Alps the mean temperature ranges from 50° to 60°. Half way up the Alps it averages about 32°—a height which, in the snowy regions, it never reaches. But even where the temperature is lowest the solar radiation produced by the rocks and snow is often so great as to raise the photometer to 120° and even higher. The exhilarating and invigorating nature of the climate in the upper regions during the summer has been acknowledged by all.

In respect to vegetation the Alps have been divided into six zones, depending on height modified by exposure and local circumstances. The first is the olive region. This tree flourishes better on sheltered slopes of the mountains than on the plains of northern Italy. The vine, which bears greater winter cold, distinguishes the second zone. On slopes exposed to the sun it flourishes to a considerable height. The third is called the mountainous region. Cereals and deciduous trees form the distinguishing features of its vegetation. The mean temperature about equals that of Great Britain, but the extremes are greater. The fourth region is the

sub-Alpine or coniferous. Here are vast forests of pines of various species. Most of the Alpine villages are in the two last regions. On the northern slopes pines grow to 8,000, and on the southern slopes to 7,000 feet above the level of the sea. This is also the region of the lower or permanent pastures where the flocks are fed in winter. The fifth is the pasture region, the term *alp* being used in the local sense of high pasture grounds. It extends from the uppermost limit of trees to the region of perpetual snow. Here there are shrubs, rhododendrons, junipers, bilberries, and dwarf willows, etc. The sixth zone is the region of perpetual snow. The line of snow varies, according to seasons and localities from 8,000 to 9,500 feet, but the line is not continuous, being often broken in upon. Few flowering plants extend above 10,000 feet, but they have been found as high as 12,000 feet.

At this great elevation are found the wild goat and the chamois. In summer the high mountain pastures are covered with large flocks of cattle, sheep, and goats, which are in winter removed to a lower and warmer level. The marmot, and white or Alpine hare, inhabit both the snowy and the woody regions. Lower down are found the wild-cat, fox, lynx, bear and wolf; the last two are now extremely rare. The vulture, eagle, and other birds of prey frequent the highest elevations, the ptarmigan seeks its food and shelter among the diminutive plants that border upon the snow-line. Excellent trout and other fish are found; but the most elevated lakes are, from their low temperature, entirely destitute of fish.

**ALSACE** (âl-sâs), before the French revolution a province of France, on the Rhine, afterward constituting the French departments of Haut- and Bas-Rhin, and subsequently to the Franco-Prussian war of 1870-71 reunited to Germany, and incorporated in the province of Elsass-Lothringen (Alsace-Lorraine). Alsace is generally a level country though there are several ranges of low hills richly wooded. The principal river is the Ill. Corn, flax, tobacco, grapes, and other fruits are grown. Area, 3,198 sq. miles; pop. 1,074,626. The inhabitants mostly speak German, and are of German race. Strasburg is the chief city. The chief productions are wine, hemp, flax, tobacco, madder, copper, iron, etc.

**ALSACE-LORRAINE**, a province of Germany, on the east of France, partly bounded by the Rhine; area, 5,600 sq. miles, of which Alsace occupies 3,198 and Lorraine 2,402. The three chief towns are Strasburg, Muhlhausen, and Metz. Pop. 1,719,470, of whom 1,310,450 are Catholics and 372,078 Protestants.

**ALTAI MOUNTAINS** (âl'ti), an important Asiatic system on the borders of Siberia and Mongolia, partly in Russian and partly in Chinese territory, between lat. 46° and 53° n., lon. 83° and 91° e., but having great eastern extensions. The Russian portion is comprised in the governments of Tomsk and Semipalatinsk, the Chinese in Dsungaria. The rivers of this region, which are large and numerous, are mostly head-waters of



the Obi and Irtish. The area covered by perpetual snow is very considerable, and glaciers occupy a wide extent. The Altai is exceedingly rich in minerals, including gold, silver, copper, and iron. The name Altai means "gold mountain." The inhabitants are chiefly Russians and Kalmuks. The chief town is Barnaul.

**ALTAR** (al'tar), any pile or structure raised above the ground for receiving sacrifices to some divinity. The Greek and Roman altars were various in form, and often highly ornamental; in temples they were usually placed before the statue of the god. In the Jewish ceremonial the altar held an important place, and was associated with many of the most significant rites of religion. Two altars were erected in the tabernacle in the wilderness, and the same number in the temple, according to instructions given to Moses in Mt. Sinai. These were called the altar of burnt-offering and the altar of incense. In some sections of the Christian church the communion-table, or table on which the eucharist is placed, is called an altar. In the primitive church it was a table of wood, but subsequently stone and metal were introduced, with rich ornaments, sculpture, and painting. After the introduction of Gothic art the altar frequently became a lofty and most elaborate structure.

**ALTAZIMUTH**, a vertical circle with a telescope so arranged as to be capable of being turned round horizontally to any point of the compass, and so differing from a transit-circle, which is fixed in the meridian. The altazimuth is brought to bear upon objects by motions affecting their altitude and azimuth.

**ALTENBURG**, a town of Germany, capital of Saxe-Altenburg, 23 miles south of Leipzig. It has some fine streets and many handsome edifices, including a splendid palace; manufactures of cigars, woolen yarn, gloves, hats, musical instruments, glass, brushes, etc. Pop. 37,110.

**ALTERATIVES** (al'-), medicines, as mercury, iodine, etc., which, administered in small doses, gradually induce a change in the habit or constitution, and imperceptibly alter disordered secretions and actions, and restore healthy functions without producing any sensible evacuation by perspiration, purging, or vomiting.

**ALTER EGO**, a second self, one who represents another in every respect.

**ALTERNATE**, in botany, placed on opposite sides of an axis at a different level, as leaves.—Alternate generation, the reproduction of young not resembling their parents, but their grandparents, continuously, as in the jelly-fishes, etc. See Generation, Alternate.

**ALTHÆA**, a genus of plants. See Hollyhock and Marshmallow.

**ALTITUDE**, in mathematics the perpendicular height of the vertex or apex of a plane figure or solid above the base. In astronomy it is the vertical height of any point or body above the horizon. It is measured or estimated by the angle subtended between the object and the plane of the horizon, and may be either true or apparent. The apparent altitude is that which is obtained immediately

from observation; the true altitude, that which results from correcting the apparent altitude, by making allowance for parallax, refraction, etc.

**ALTO**, in music, the highest singing voice of a male adult, the lowest of a boy or a woman, being in the latter the same as contralto. The alto, or counter-tenor, is not a natural voice, but a development of the falsetto. It is almost confined to English singers, and the only music written for it is by English composers. It is especially used in cathedral compositions and glees.

**AL'TON**, a town in Illinois, on the Mississippi near the mouth of the Missouri, with a state penitentiary, several mills and manufactories, and in the neighborhood limestone and coal. Pop. 17,000.

**AL'TONA**, an important commercial city in the Prussian province of Schleswig-Holstein, on the right bank of the Elbe, adjoining Hamburg, with which it virtually forms one city. It is a free port, and its commerce, both inland and foreign, is large, being quite identified with that of Hamburg. Pop. 161,507.

**ALTOONA**, a town in Pennsylvania, at the eastern base of the Alleghenies, 244 miles west of Philadelphia, with large machine-shops and locomotive factories. Pop. 45,000.

**AL'TRUISM**, a term first employed by the French philosopher Comte, to signify devotion to others or to humanity; the opposite of selfishness or egoism.

**AL'UM**, a well-known crystalline, astringent substance with a sweetish taste, a double sulphate of potassium and aluminium with a certain quantity of water of crystallization. It crystallizes in regular octahedrons. Its solution reddens vegetable blues. Exposed to heat its water of crystallization is driven off, and it becomes light and spongy with slightly corrosive properties, and is used as a caustic under the name of burnt alum. Common alum is strictly potash alum; other two varieties are soda alum and ammonia alum, both similar in properties. The importance of alum in the arts is very great, and its annual consumption is immense. It is employed to increase the hardness of tallow, to remove greasiness from printers' cushions and blocks in calico manufactories; in dyeing it is largely used as a mordant. It is also largely used in the composition of crayons, in tannery, and in medicine (as an astringent and styptic). Wood and paper are dipped in a solution of alum to render them less combustible.

**ALU'MINA**, the single oxide of the metal aluminium. As found native it is called corundum, when crystallized ruby or sapphire, when amorphous emery. It is next to the diamond in hardness. In combination with silica it is one of the most widely distributed of substances, as it enters in large quantity into the composition of granite, traps, slates, schists, clays, loams, and other rocks. The porcelain clays and kaolins contain about half their weight of this earth, to which they owe their most valuable properties. It has a strong affinity for coloring matters, which causes it to be employed in the preparation of the colors called lakes in dyeing and calico-printing. It combines with the acids and forms

numerous salts, the most important of which are the sulphate and acetate, the latter of extensive use as a mordant.

**ALUMINIUM**, a metal discovered in 1827, but nowhere found native, though as the base of alumina (which see) it is abundantly distributed. The mineral cryolite—a fluoride of aluminium and sodium—which is brought from Greenland, is one of the chief sources of aluminium. It is a shining white metal, of a color between silver and platinum, very light, weighing less than glass, and about one-fourth of silver, not liable to tarnish nor undergo oxidation in the air, very ductile and malleable, and remarkably sonorous. It forms several useful alloys with iron and copper; one of the latter (aluminium gold) much resembles gold, and is made into cheap trinkets. Another, known as aluminium bronze, possesses great hardness and tenacity. Spoons, tea and coffee pots, dish-covers, musical and mathematical instruments, trinkets, etc., are made of aluminium.

**ALUM-ROOT**, the name given in America to two plants on account of the remarkable astringency of their roots, which are used for medical purposes.

**ALUM-SLATE**, a slaty rock from which much alum is prepared; color grayish, bluish, or iron-black; often possessed of a glossy or shining luster; chiefly composed of clay (silicate of alumina), with variable proportions of sulphide of iron (iron-pyrites), lime, bitumen, and magnesia.

**ALUM-STONE**, a mineral of a grayish or yellowish-white color, approaching to earthy in its composition, from which (in Italy) is obtained a very pure alum by simply subjecting it to roasting and lixiviation.

**AL'VA**, or **AL'BA**, Ferdinand Alvarez, Duke of, Spanish statesman and general under Charles V. and Philip II.; was born in 1508; early embraced the military career, and fought in the wars of Charles V. in France, Italy, Africa, Hungary, and Germany. He is more especially remembered for his bloody and tyrannical government of the Netherlands (1567-73), which had revolted, and which he was commissioned by Philip II. to reduce to entire subjection to Spain. Hopeless of finally subduing the country he asked to be recalled, and accordingly, in December, 1573, Alva left the country, in which, as he himself boasted, he had executed 18,000 men. He was received with distinction in Madrid, but did not long enjoy his former credit. He had the honor, however, before his death (which took place in 1582) of reducing all Portugal to subjection to his sovereign. It is said of him that during sixty years of warfare he never lost a battle and was never taken by surprise.

**ALVARADO** (al-va-rā'dō), Pedro de, one of the Spanish "conquistadors," was born toward the end of the 15th century, and died in 1541. Having crossed the Atlantic he was associated (1519) with Cortez in his expedition to conquer Mexico; and was intrusted with important operations. In July, 1520, during the disastrous retreat from the capital after the death of Montezuma, the perilous command of the rear-guard was assigned to Alvarado. On his return to Spain he



was received with honor by Charles V., who made him governor of Guatemala, which he had himself conquered. To this was subsequently added Honduras. He continued to add to the Spanish dominions in America till his death.

**ALWAR** (al-war'), a state of north-western Hindustan, in Rajputana; area, 3024 square miles. This semi-independent state has as its ruler a rajah with a revenue of about \$1,000,000; military force, about 5000 infantry and 2000 cavalry. Pop. 828,888.—Alwar, the capital, is situated at the base of a rocky hill crowned by a fort, 80 miles s.s.w. of Delhi, surrounded by a moat and rampart, and poorly built, but with fine surroundings; contains the rajah's palace and a few other good buildings. Pop. 56,771.

**AMADE'US**, Duke of Aosta, second son of Victor Emanuel of Italy, and brother of the present king, was born in 1845, and was chosen by the Cortes King of Spain in 1870, Queen Isabella having had to leave the country in 1868. He abdicated in 1873 and returned to Italy. He died in 1890.

**AMAL'FI**, a seaport in southern Italy on the gulf of Salerno, 23 miles from Naples, the seat of a bishop, a place of



The Cathedral, Amalfi.

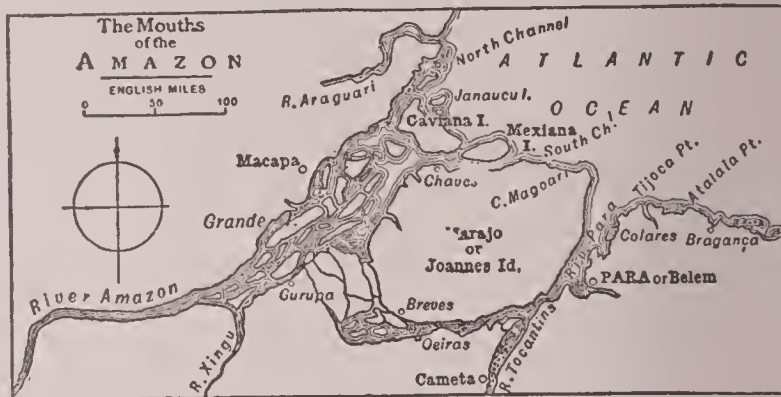
great commercial importance in the middle ages, enjoying a republican constitution of its own. Pop. 11,242.

**AMAL'EKITES**, a Semitic race occupying the peninsula between Egypt and Palestine, named after a grandson of Esau. They were denounced by Moses for their hostility to the Israelites during their journey through the wilderness, and they seem to have been all but exterminated by Saul and David.

**AMAL'GAM**, a name applied to the alloys of mercury with the other metals. One of them is the amalgam of mercury with tin, which is used to silver looking-glasses. Mercury unites very readily with gold and silver at ordinary temperatures, and advantage is taken of this to separate them from their ores, the process being called amalgamation. The mercury being properly applied dissolves and combines with the pre-

cious metal and separates it from the waste matters, and is itself easily driven off by heat.

**AMARAPURA** (a-ma-ra-pō'ra), a deserted city, once the capital of the Burmese Empire, on the left bank of the Irawaddy, quite close to Mandalay. The population in 1800 was 175,000.



**AMARYLLIDA'CEÆ**, an order of monocotyledonous plants, generally bulbous, occasionally with a tall, cylindrical, woody stem; with a highly colored flower, six stamens, and an inferior three-celled ovary; natives of Europe and most of the warmer parts of the world. The order includes the snowdrop, the snowflake, the daffodil, the belladonna-lily (belonging to the typical genus *Amaryllis*), the so-called Guernsey-lily (probably a native of Japan), the Brunsvigias, the blood-flowers (*Hæmanthus*) of the Cape of Good Hope, different species of *Narcissus*, *Agave* (American aloe), etc.

**AM'ATEUR**, any person who pursues an art, science, or other work not for money or other material consideration but for the pure love of the thing itself. In sports the definition of an amateur is made by the rules of the Amateur Athletic union; and this definition may be regarded as the type for sports of all kinds. According to the rules of competition nobody is eligible who in any manner has received compensation of any kind for his work, or who has competed with a professional, or who has in any way realized money through any connection with sport itself, such as the sale of prizes, etc. In certain sports, such as golf, the lines are not so closely drawn, so that playing with a professional does not constitute one a professional. The rules of amateurism in cycling were for years a mere form, as every large manufacturer had his own racers on the track.

**AMAURO'SIS**, a species of blindness, caused by disease of the nerves of vision. The most frequent causes are a long-continued direction of the eye on minute objects, long exposure to a bright light, to the fire of a forge, to snow, or irritating gases, overfulness of blood, disease of the brain, etc. If taken in time it may be cured or mitigated; but confirmed amaurosis is usually incurable.

**AM'AZON**, **AM'AZONS**, a river of South America, the largest in the world, formed by a great number of sources which rise in the Andes; general course

north of east; length including windings between 3000 and 4000 miles; area of drainage basin 2,300,000 sq. miles. It enters the Atlantic under the equator by a mouth 200 miles wide, divided into two principal and several smaller arms by the large island Marajo, and a number of smaller islands. In its upper

course navigation is interrupted by rapids, but from its mouth upward for a distance of 3300 miles (mostly in Brazil) there is no obstruction. From the sea to the Rio Negro, 750 miles in a straight line, the depth is nowhere less than 30 fathoms; up to the junction of the Ucayale there is depth sufficient for the largest vessels. The Amazonian water system affords some 50,000 miles of river suitable for navigation. The rapidity of the river is considerable, especially during the rainy season (January to June), when it is subject to floods; but there is no great fall in its course. The tides reach up as far as 400 miles from its mouth. The singular phenomenon of the bore, or as it is called on the Amazon the pororoca, occurs at the mouth of the river at springtides on a grand scale. The river swarms with alligators, turtles, and a great variety of fish. The country through which it flows is extremely fertile, and is mostly covered with immense forests; it must at some future time support a numerous population, and be the theater of a busy commerce. Steamers and other craft ply on the river, the chief center of trade being Para, at its mouth.

**AMAZ'ONAS**, the largest state of Brazil, traversed by the Amazon and its tributaries; area, 753,000 sq. miles; pop. 148,000.

**AM'AZONS**, according to an ancient Greek tradition, the name of a community of women, who permitted no men to reside among them, fought under the conduct of a queen, and long constituted a formidable state. They were said to burn off the right breast that it might not impede them in the use of the bow.

**AMBA'LA**, a town of India, in the Punjab. The military cantonment is several miles distant. Total pop. 78,638.

**AMBAS'SADOR**, a minister of the highest rank, employed by one prince or state at the court of another to manage the public concerns, or support the interests of his own prince or state, and representing the power and dignity of his sovereign or state. Ambassadors are ordinary when they reside perma-



nently at a foreign court, or extraordinary when they are sent on a special occasion. When ambassadors extraordinary have full powers, as of concluding peace, making treaties, and the like, they are called plenipotentiaries. Ambassadors are often called simply ministers. Envoys are ministers employed on special occasions, and are of less dignity than ambassadors. The term ambassador, however, is also used in a more general sense for any diplomatic agent or minister. An ambassador and his suite are not amenable to the laws of the country in which they are residing.

**AM'BER**, a semi-mineral substance of resinous composition, a sort of fossil resin, the produce of extinct Coniferæ. It is usually of yellow or reddish-brown color; brittle; yields easily to the knife; is translucent, and possessed of a resinous luster. Specific gravity, 1.065. It burns with a yellow flame, emitting a pungent aromatic smoke, and leaving a light carbonaceous residue, which is employed as the basis of the finest black varnishes. By friction it becomes strongly electric. It is found in masses from the size of coarse sand to that of a man's head, and occurs in beds of bituminous wood situated upon the shores of the Baltic and Adriatic Seas; also in Poland, France, Italy, and Denmark. It is often washed up on the Prussian shores of the Baltic, and is also obtained by fishing for it with nets. Sometimes it is found on the east coast of Britain, in gravel pits round London, also in the United States.

**AM'BERGRIS**, a substance derived from the intestines of the sperm-whale, and found floating or on the shore; yellowish or blackish white; very light; melts at 140°, and is entirely dissipated on red-hot coals; is soluble in ether, volatile oils, and partially in alcohol, and is chiefly composed of a peculiar fatty substance. Its odor is very agreeable, and hence it is used as a perfume.

**AMBIDEX'TROUS**, having the faculty of using the left hand as effectively as the right.

**AMBLYOP'SIS**, a genus of blind fishes, containing only one species, found in the Mammoth Cave of Kentucky.

**AMBOY'NA**, **AMBOINA**, or **APON**, one of the Molucca Islands in the Indian Archipelago, close to the large island of Ceram; area, about 280 sq. miles. Its surface is generally hilly or mountainous, its general aspect beautiful, and its climate on the whole salubrious, but it is not infrequently visited by earthquakes. It affords a variety of useful trees, including the cocoanut and sago palms. Cloves and nutmegs are the staple productions. The soil in the valleys and along the shores is very fertile, but a large portion remains uncultivated. The natives are mostly of Malayan race. The capital, also called Amboyna, is situated on the Bay of Amboyna, and is well built and defended by a citadel. The streets are planted on each side with rows of fruit-trees. It is a free port. Pop. 10,500.

**AM'BROSE**, Saint, a celebrated father of the church; born in A.D. 333 or 334, probably at Treves, where his father was prefect; died in 397. His kindness and wisdom gained him the es-

teem and love of the people, and in 374 he was unanimously called to the bishopric of Milan, though not yet baptized. His writings, which are numerous, show that his theological knowledge extended little beyond an acquaintance with the works of the Greek fathers. He wrote Latin hymns, but the Te Deum Laudamus, which has been ascribed to him, was written a century later. He introduced the Ambrosian Chant, a mode of singing more monotonous than the Gregorian which superseded it. He also compiled a form of ritual known by his name.

**AMBRO'SIA**, in Greek mythology the food of the gods, as nectar was their drink.

**AM'BULANCE**, a hospital establishment which accompanies an army in its movements in the field for the purpose of providing assistance and surgical treatment to the soldiers wounded in battle. The name is often given to one of the carts, wagons, or litters used to transfer the wounded from the spot where they fell to the hospital. One form of ambulance wagon is a strong but light vehicle with an upright frame, from which two stretchers are slung from the top for the accommodation of those most severely wounded; seats before and behind are provided for those suffering from less serious wounds. The hospital chests, containing surgical instruments, bandages, splints, etc., are placed in the bottom of the wagon or lashed to its under surfaces. A thorough ambulance system in connection with armies in the field is of quite recent introduction. A training in ambulance work is now being recognized as of importance beyond the field of military affairs, and as being of the utmost service wherever serious accidents are likely to happen, as, for instance, in large cities and in connection with large industrial establishments.

**AM'BUSH**, a term of strategy used to designate the act of hiding and taking the enemy by surprise. An ambush may be large or small, involving only a few men or an entire army. It was this method of warfare which was used almost exclusively by the Boers in their recent war with England in South Africa.

**AMEN** (ā-men'), a Hebrew word, signifying "verily," "truly," transferred from the religious language of the Jews to that of the Christians, and used at the end of prayers as equivalent to "so be it," "may this be granted."

**AMEND'MENT**, a proposal brought forward in a meeting of some public or other body, either in order to get an alteration introduced on some proposal already before the meeting, or entirely to overturn such proposal. In parliament an amendment denotes an alteration made in the original draught of a bill while it is passing through the houses. Amendments may be made so as totally to alter the nature of the proposition; and this is a way of getting rid of a proposition, by making it bear a sense different from what was intended by the movers, who are thus compelled to abandon it.

**AMENO'PHIS** (or **AMENHOTEP**) III., a king of ancient Egypt about 1500

B.C.; warred successfully against Syrians and Ethiopians, built magnificent temples and palaces at Thebes, where the so-called Memnon statue is a statue of this king.

**AMENORRHŒ'A**, absence or suspension of menstruation. The former may arise from general debility or from defective development, the latter from exposure to cold, from attacks of fever or other ailment, violent excitement, etc.

**AMENTA'CEÆ**, an order of plants having their flowers arranged in amenta or catkins; now broken up into several orders, the chief of which are the birch, the willow, the liquidambar, the plane, the nut.

**AMEN'TUM**, in botany, that kind of inflorescence which is commonly known as a catkin (as in the birch or willow), consisting of unisexual apetalous flowers in the axil of scales or bracts.

**AMERICA**, or the **NEW WORLD**, the largest of the great divisions of the globe except Asia, is washed on the west by the Pacific, on the east by the Atlantic, on the north by the Arctic Ocean, on the south tapers to a point. On the northwest it approaches within about 50 miles of Asia, while on the northeast the island of Greenland approaches within 370 miles of the European island Iceland; but in the south the distance between the American mainland and Europe or Africa is very great. America as a whole forms the two triangular continents of North and South America, united by the narrow Isthmus of Panama, and having an entire length of about 10,000 miles; a maximum breadth (in North America) of 3500 miles; a coast line of 44,000 miles; and a total area, including the islands, of nearly 16,000,000, of which N. America contains about 9,000,000 sq. miles. South America is more compact in form than N. America, in this respect resembling Africa, while N. America more resembles Europe. Between the two on the east side is the great basin which comprises the Gulf of Mexico, the Caribbean Sea, and the West India Islands. Like Europe also N. America possesses numerous islands, while those of S. America are less important and confined almost to the southern extremity.

Three-fourths of the area of America is comparatively flat, and this portion of the surface is bounded on the west by lofty mountain systems which stretch continuously from north to south between the extremities of the continent, generally at no great distance from the west shore. In North America the Rocky Mountains, a broad series of masses partly consisting of plateaux, form the most important portion of the elevated surface, being continued southward in the mountains and tableland of Mexico and the ranges of Central America. Separated by depressions from the Rocky Mountains proper, and running close to and parallel with the western coast, are several lofty ranges (Sierra Nevada, Cascade Mountains, etc.). Near the eastern coast, and forming an isolated mass, are the Appalachians, a system of much inferior magnitude. The loftiest mountains in N. America are Mount Logan (19,514



ft.), Mount St. Elias (18,017), both in N. W. Canada; and Popocatepetl (18,000 ft.). The depression of the Isthmus of Panama (about 260 ft.) forms a natural separation between the systems of the north and the south. In S. America the Andes form a system of greater elevation but less breadth than the Rocky Mountains, and consist of a series of ranges (cordilleras) closely following the line of the west coast from the Isthmus of Panama to Cape Horn. The highest summits seem to be Aconcagua (22,860 ft.), Sorata or Illampu (21,484), and Sahama (21,054). Volcanoes are numerous. Isolated mountain groups of minor importance are the highlands of Venezuela and of Brazil, the latter near the eastern coast, reaching a height of 10,000 feet.

The fertile lowlands which lie to the east of the Rocky Mountains and the Andes form a depression extending through both continents from the northern to the southern oceans. They have somewhat different features and different names in different portions; in N. America are prairies and savannahs, in S. America llanos, selvas and pampas.

Through these low grounds flow the numerous great rivers which form so characteristic a feature of America. The principal are the Mackenzie, Coppermine, and Great Fish rivers, entering the Northern Ocean; the Churchill, Nelson, Severn, and Albany, entering Hudson's Bay; the St. Lawrence, entering the Atlantic; Mississippi and Rio del Norte, entering the Gulf of Mexico (all these being in N. America); the Magdalena, Orinoco, Amazon, Paranaíba, Rio de la Plata, Colorado, and Rio Negro, entering the Atlantic (all in S. America); and the Yukon, Fraser, Columbia, San Joaquin, Sacramento, and Colorado, entering the Pacific. The rivers which flow into the Pacific, however, owing to the fact that the great backbone of the continent, the Rocky Mountains and the Andes, lies so near the west coast, are of comparatively little importance, in S. America being all quite small. Sometimes rivers traversing the same plains, and nearly on the same levels, open communications with each other, a remarkable instance being the Cassiquiare in S. America, which, branching off from the Rio Negro and joining the Orinoco, forms a kind of natural canal, uniting the basins of the Orinoco and the Amazon. The Amazon or Marañon in S. America, the largest river in the world, has a course of about 3500 miles, and a basin of 2,300,000 square miles; the Mississippi-Missouri, the largest river of North America, runs a longer course than the Amazon, but the area of its basin is not nearly so great. North America has the most extensive group of lakes in the world—Lakes Superior, Michigan, Huron, Erie, and Ontario, which through the St. Lawrence send their drainage to the Atlantic. Thus by means of lakes and rivers the interior of both N. and S. America is opened up and made accessible.

With regard to climate N. America naturally differs very much from S. America, and has more resemblance to

the continents of Europe and Asia (regarded as a whole). In N. America, as in the older continent, the eastern parts are colder than the western, and hence the towns on the Atlantic coast have a winter temperature about 10° lower than those in corresponding latitudes of Europe. The winter temperature of the greater part of N. America is indeed severe, though the intense cold is less felt on account of the dryness of the air. There is no regular season of rainfall unless in the south. Although two-thirds of S. America lies within the tropics the heat is not so great as might be expected, owing to the prevailing winds, the influences of the Andes, and other causes. The highest temperature experienced is probably not more than 100° in the shade; at Rio de Janeiro the mean is about 74°, at Lima 72°. Over a great part of S. America there is a wet and dry season, varying in different regions; on the upper Amazon the rains last for ten months, being caused by the prevailing easterly winds bringing moisture from the Atlantic, which is condensed on the eastern slopes of the Andes. In each of the Americas there is a region in which little or no rain falls; in N. America it extends over a part of the United States and northern Mexico, in S. America over a part of the coast region of Peru and Chile.

America is rich in valuable minerals. It has supplied the world with immense quantities of gold and silver, which it still yields in no small amount, especially in the United States. It possesses inexhaustible stores of coal (U. States), with iron, copper, lead, tin, mercury, etc. Petroleum may be called one of its specialties, its petroleum wells having caused whole towns to spring into existence. Diamonds and other precious stones are found.

As regards vegetation America may be called a region of forests and verdure, vast tracts being covered by the grassy prairies, llanos, and pampas where the forests fail. In N. America the forests have been largely made use of by man; in S. America vast areas are covered with forests, which as yet are traversed only by the uncivilized Indian. In the north is the region of pines and firs; farther south come the deciduous trees, as the oak, beech, maple, elm, chestnut, etc. Then follow the evergreen forests of the tropical regions. The useful timber trees are very numerous; among the most characteristic of America are mahogany and other ornamental woods, and various dyewoods. In the tropical parts are numerous palms, cacti in great variety, and various species of the agave or American aloe. In the virgin forests of S. America the trees are often bound together into an impenetrable mass of vegetation by various kinds of climbing and twining plants. Among useful plants belonging to the American continent are maize, the potato, cacao, tobacco, cinchona, vanilla, Paraguay tea, etc. The most important plants introduced are wheat, rice, and other grains, sugar-cane, coffee, and cotton, with various fruits and vegetables. The vine is native to the continent, and both the American and introduced varieties are now largely cultivated.

The animals of America include, among carnivora, the jaguar or American tiger, found only in S. America; the puma or American lion, found mostly in S. America; the grizzly bear of N. America, fully as powerful an animal as either; the black bear, the skunk, the raccoon, the American or prairie-wolf, several species of fox, etc. The rodents are represented by the beaver, the porcupine, and squirrels of several species; the marsupials by the opossum. Among ruminants are the bison, or, as it is commonly called, the buffalo, the moose or elk, the Virginian stag, the musk-ox; and in S. America the llama (which takes the place of the camel of the Old World), the alpaca, and the vicuña. Other animals most distinctive of S. America are sloths, fitted to live only in its dense and boundless forests; anteaters and armadillos; monkeys with prehensile tails, in this and other respects differing from those of the Old World; the condor among the heights of the Andes, the nandu, rhea or three-toed ostrich, beautiful parrots and humming-birds. Among American reptiles are the boa-constrictor, the rattlesnake, the alligator or cayman, the iguana and other large lizards, large frogs and toads. The domestic animals of America, horses, cattle, and sheep, are of foreign origin. The electrical eel exists in the tropical waters.

The population of America consists partly of an aboriginal race or races, partly of immigrants or their descendants. The aboriginal inhabitants are the American Indians or red men, being generally of a brownish-red color, and now forming a very small portion of the total population, especially in N. America, where the white population has almost exterminated them. These people are divided into branches, some of which have displayed a considerable aptitude for civilization. When the Europeans became acquainted with the New World, Mexico, Central and part of S. America were inhabited by populations which had made great advances in many things that pertain to civilized life, dwelling in large and well-built cities under a settled form of government, and practicing agriculture and the mechanical arts. Ever since the discovery of America at the close of the 15th century Europeans of all nations have crowded into it; and the comparatively feeble native races have rapidly diminished, or lost their distinctive features by intermixtures with whites, and also with negroes brought from Africa to work as slaves. These mixed races are distinguished by a variety of names, as Mestizos, Mulattoes, Zambos, etc. In North America the white population is mainly of British origin, though to a considerable extent it also consists of Germans, Scandinavians, etc., and the descendants of such. In Central and South America the prevailing white nationality is the Spanish and Portuguese. In the extreme North are the Eskimos—a scattered and stunted race closely allied to some of the peoples of northern Asia. That the aboriginal inhabitants of America passed over from Asia is tolerably certain, but when and from what part we do not know.



The total population of the New World was estimated in 1900 at 135,000,000, of which perhaps 85,000,000 were whites, 26,000,000 mixed races, 13,000,000 negroes, and 11,000,000 Indians. As regards religion the bulk of the population of N. America is Protestant; of Central and S. America the religion is almost exclusively Roman Catholic. Several millions of the Indians are heathens.—The independent states of America are all republican in form of government, Brazil having become a republic in 1889. See North America, Central America, South America, West Indies, etc.

The merit of first unlocking the American continent to modern Europe belongs to the Genoese navigator Christopher Columbus, who discovered, in October, 1492, one of the Bahamas, and named it San Salvador. Europeans, however, had on different former occasions discovered the American coasts, and the coasts of Massachusetts and Rhode Island were visited by Northmen and named Vinland in the year 1000. Still these discoveries had no influence on the enterprise of Columbus, and cannot detract in the least from his merit; they were forgotten, and had never been made known to the inhabitants of the rest of Europe. Though Columbus was the first of his time who set foot on the New World, it has taken its name not from him, but from Amerigo Vespucci. The mainland was first seen in 1497 by Sebastian Cabot, who sailed under the patronage of Henry VII. of England. For further particulars of discovery see North America and South America.

The known history of America hardly goes beyond the period of its discovery by Columbus; but it possesses many monuments of antiquity that might take us many centuries backward, could we learn anything of their origin or of those by whom they were produced. Among such antiquities are great earthworks in the form of mounds, or of raised inclosures, crowning the tops of hills, river peninsulas, etc., and no doubt serving for defense. They inclose considerable areas, are surrounded by an exterior ditch, and by ramparts which are composed of mingled earth and stones, and are often of great extent in proportion to the area inclosed. They are always supplied either naturally or artificially with water, and give other indications of having been provided for a siege. Barrows and tumuli containing human bones, and which bear indications of having been used both as places of sepulture and as temples, are also numerous. They are in geometrical forms: circles, squares, parallelograms, etc. A mound on the plain of Cahokia in Illinois, opposite the city of St. Louis, is 700 feet long, 500 feet broad, and 90 feet high. Another class of earth mounds represent gigantic animal forms in bas-relief on the ground. One is a man with two heads, the body 50 feet long and 25 feet broad across the breast; another represents a serpent 1000 feet in length, with graceful curves. The monuments of Mexico, Central America, and Peru are of a more advanced state of civilization, approach nearer to the historical period, and make the loss of authentic information more

severely felt. Here there are numerous ruined towns with most elaborate sculptures, lofty pyramidal structures serving as temples or forts, statues, picture writing, hieroglyphics, roads, aqueducts, bridges, etc. Some remarkable prehistoric remains discovered in recent years are what are known as the abodes of the "cliff-dwellers." These consist of habitations constructed on terraces and in caves high up the steep sides of cañons in Colorado and other parts of the western states of N. America. Some of these buildings are several stories high. See also Mexico, Peru, etc.

**AMERICAN INDIANS.** See Indians.

**AMERICANISM**, a term, phrase, or idiom peculiar to the English language as spoken in America, and not forming part of the language as spoken in England. The following is a list of a few of the more noteworthy Americanisms: Appropriate, to approve.

Around or round, about or near. To hang around is to loiter about a place.

Backwoods, the partially cleared forest regions in the western states.

Bee, an assemblage of persons to unite their labors for the benefit of an individual or family, or to carry out a joint scheme.

Bogus, false, counterfeit.

Boss, an employer or superintendent of laborers, a leader.

Bug, a coleopterous insect, or what in England is called a beetle.

Buggy, a four-wheeled vehicle.

Bulldoze, to; to intimidate voters.

Bunkum or buncombe, a speech made solely to please a constituency; talk for talking's sake, and in an inflated style.

Bureau, a chest of drawers; a dressing-table surmounted by a mirror.

Calculate, to suppose, to believe, to think.

Camp-meeting, a meeting held in the fields or woods for religious purposes, and where the assemblage encamp and remain several days.

Cane-brake, a thicket of canes.

Car, a carriage or wagon of a railway train. The Englishman "travels by rail" or "takes the train"; but the American takes or goes by the cars.

Carpet-bagger, a needy political adventurer who carries all his earthly goods in a carpet-bag.

Caucus, a private meeting of the leading politicians of a party to agree upon the plans to be pursued in an approaching election.

Chalk: a long chalk means a great distance, a good deal.

Chunk, a short thick piece of wood or any other material.

Clever, good-natured, obliging.

Cocktail, a stimulating drink made of brandy or gin mixed with sugar, and a very little water.

Corn, maize; in England, wheat, or grain in general.

Corn-husking, or corn-shucking, an occasion on which a farmer invites his neighbors to assist him in stripping the husks from his Indian corn.

Cowhide, a whip made of twisted strips of rawhide.

Creek, a small river or brook; not, as in England, a small arm of the sea.

Cunning, small and pretty, nice, as it was such a cunning baby.

Dander: to get one's dander raised, to have one's dander up, is to have been worked into a passion.

Dead-heads, people who have free admission to entertainments, or who have the use of public conveyances, or the like, free of charge.

Depot, a railway station.

Down east, in or into the New England States. A down-easter is a New Englander.

Drummer, a bagman or commercial traveler.

Dry goods, a general term for such articles as are sold by linen-draper, haberdashers, hosiers, etc.

Dutch, the German language.—Dutchman, a German.

Fix, to; to put in order, to prepare, to adjust. To fix the hair, the table, the fire, is to dress the hair, lay the table, make up the fire.

Fixings, arrangements, dress, embellishments, luggage, furniture, garnishings of any kind.

Gerrymander, to arrange political divisions so that in an election one party may obtain an advantage over its opponent, even though the latter may possess a majority of votes in the state; from the deviser of such a scheme, named Gerry, governor of Massachusetts.

Given name, a Christian name.

Grit, courage, spirit, mettle.

Guess, to; to believe, to suppose, to think, to fancy; also used emphatically, as "Joe, will you liquor up?" "I guess I will."

Gulch, a deep abrupt ravine, caused by the action of water.

Happen in, to; to happen to come in or call.

Help, a servant.

High-falutin, inflated speech, bombast.

Hoe-cake, a cake of Indian meal baked on a hoe or before the fire.

Indian summer, the short season of pleasant weather usually occurring about the middle of November.

Johnny Cake, a cake made of Indian corn meal mixed with milk or water and sometimes a little stewed pumpkin; the term is also applied to a New Englander.

Julep, a drink composed of brandy or whisky with sugar, pounded ice, and some sprigs of mint.

Loafer, a lounging, a vagabond.

Log-rolling, the assembly of several parties of wood-cutters to help one of them in rolling their logs to the river after they are felled and trimmed; also employed in politics to signify a like system of mutual cooperation.

Lot, a piece or division of land, an allotment.

Lumber, timber sawed and split for use; as beams, joists, planks, staves, hoops, etc.

Lynch law, an irregular species of justice executed by the populace or a mob, without legal authority or trail.

Mail letters, to; to post letters.

Make tracks, to; to run away.

Mitten: to get the mitten is to meet with a refusal.

Mizzle, to; to abscond, or run away.

Mush, a kind of hasty-pudding.

Muss, a state of confusion.



Notions, a term applied to every variety of smallwares.

One-horse: a one-horse thing is a thing of no value or importance, a mean and trifling thing.

Picaninny, a negro child.

Pile, a quantity of money.



Amerigo Vespucci.

Planks, in a political sense, are the several principles which appertain to a party; platform is the collection of such principles.

Reckon, to; to suppose, to think.

Rile, to; to irritate, to drive into a passion.

Rock, a stone of any size; a pebble; as to throw rocks at a dog.

Rooster, the common domestic cock.

Scalawag, a scamp, a scapegrace.

Shanty, a mean structure such as squatters erect; a temporary hut.

Skedaddle, to; to run away; a word introduced during the civil war.

Skidoo, to get out.

Smart, often used in the sense of considerable, a good deal, as a smart chance.

Soft sawder, flattering, coaxing talk.

Span of horses, two horses as nearly as possible alike, harnessed side by side.

Spread-eagle style, a compound of exaggeration, bombast, mixed metaphor, etc.

Spry, active.

Stampede, the sudden flight of a crowd or number.

Store, a shop, as a bookstore, a grocery store.

Strike oil, to; to come upon petroleum: hence to make a lucky hit, especially financially.

Stump speech, a bombastic speech calculated to please the popular ear, such speeches in newly-settled districts being often delivered from stumps of trees.

Sun-up, sunset, sunrise.

Tall, great, fine (used by Shakespeare pretty much in the same sense); tall talk is extravagant talk.

Ticket: to vote the straight ticket is to vote for all the men or measures your party wishes.

Truck, the small produce of gardens; truck patch, a plot in which the smaller fruits and vegetables are raised.

Ugly, ill-tempered, vicious.

Vamose, to; to run off (from the Spanish vamos, let us go).

Wilt, to; to fade, to decay, to droop, to wither.

**AMERIGO VESPUCCI** (a-mer-ē'gō ves-pu'tchē), a maritime discoverer, after whom America has been named; born, 1451, at Florence, died, 1512, at Seville. In 1499 he coasted along the continent of America for several hundred leagues, and the publication of his narrative, while the prior discovery of Columbus was yet comparatively a secret, led to the giving of his name to the new continent.

**AMES**, Fisher, an American orator and congressman, born at Dedham, Mass., April 9, 1758. His efforts in favor of the Federal constitution in the Massachusetts convention of 1788 resulted in his election to congress, where he served for eight years. In his later years he served in the Massachusetts council, delivered a eulogy on Washington before the legislature, and produced a number of essays. In 1804 he declined the presidency of Harvard. He died July 4, 1808.

**AMES**, Nathan P., an American manufacturer, born in Massachusetts in 1803, died 1847. He was the owner of extensive cutlery and bronze works,



*Nathan Ames*

and cast a number of well-known public monuments.

**AMES**, Oaks, an American shovel manufacturer, railroad capitalist, and western pioneer. He was one of the builders of the Southern Pacific railroad, was a member of congress from Massachusetts, and filled other public offices. Mr. Ames was born in 1804, and died in 1873.

**AMES**, Oliver, American statesman, son of Oaks Ames. He was born in Massachusetts in 1831, died in 1895. He succeeded to his father's immense wealth. In 1886 he was elected governor of Massachusetts, and was twice re-elected.

**AMETAB'OLA**, a division of insects, including only the apterous or wingless insects, as lice, spring-tails, etc., which do not undergo any metamorphosis, but which escape from the egg nearly under the same form which they preserve through life.

**AM'ETHYST**, a violet-blue or purple variety of quartz, generally occurring crystallized in hexahedral prisms or pyramids, also in rolled fragments, composed of imperfect prismatic crystals. It is wrought into various articles of jewelry. The oriental amethyst is a rare violet-colored gem, a variety of alumina or corundum, of much brilliance and beauty.

**AMHERST** (am'erst), a seaport of Lower Burmah, 31 miles south of Moulmein, a health resort of Europeans. Pop. 5000.—The district of Amherst has an area of 15,189 sq. miles; pop. 301,086.

**AMHERST**, Jeffery, Lord, born 1717, died 1797; distinguished British general who fought at Dettingen and Fontenoy, and commanded in America, where he took Louisburg, Ticonderoga, and Quebec, and restored the British prestige in Canada. He was raised to the peerage, became commander-in-chief, and ultimately field-marshal.

**AMHERST**, William Pitt, first earl, nephew of the above; Governor-general of India, 1823; prosecuted the first Burmese war, and suppressed the Barrackpore mutiny. Born 1773, died 1857.

**AMICE** (am'is), an oblong piece of linen with an embroidered apparel sewed upon it, worn under the alb by priests of the R. Cath. Church when engaged in the service of the mass.

**AMIENS** (ā-mē-an), a town of France, capital of the department of Somme, on the railway from Boulogne to Paris. Having water communication with the sea by the Somme, which is navigable for small vessels, it has a large trade and numerous important manufactures, especially cottons and woolens. It was taken by the Germans in 1870. Pop. 90,038.—The Peace of Amiens, concluded between Great Britain, France, Spain, and the Batavian Republic, March 27, 1802, put an end for a time to the great war which had lasted since 1793.

**AMMERGAU** (ām'er-gou), a district in Upper Bavaria, having its center in the villages of Ober and Unter Ammergau. The former village is famous on account of the Passion Play which is performed there, at intervals usually of ten years.



Ammon.

**AM'MON**, an ancient Egyptian deity, one of the chief gods of the country, identified by the Greeks with their supreme god Zeus, while the Romans regarded him as the representative of

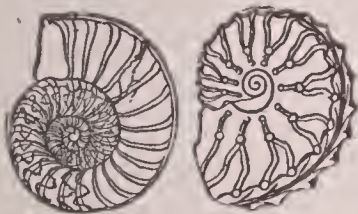


Jupiter; represented as a ram, as a human being with a ram's head, or simply with the horns of a ram. There was a celebrated temple of Ammon in the Oasis of Siwah in the Libyan desert.

**AMMONIA**, an alkaline substance, which differs from the other alkalis by being gaseous, and is hence sometimes called the volatile alkali. It is a colorless pungent gas, composed of nitrogen and hydrogen. It was first procured in that state by Priestley, who termed it alkaline air. He obtained it from sal-ammoniac by the action of lime, by which method it is yet generally prepared. It is used for many purposes, both in medicine and scientific chemistry; not, however, in the gaseous state, but frequently in solution in water, under the names of liquid ammonia, aqueous ammonia, or spirits of harts-horn. It may be procured naturally from putrescent animal substances; artificially it is chiefly got from the distillation of coal and of refuse animal substances, such as bones, clippings and shavings of horn, hoof, etc. It may also be obtained from vegetable matter when nitrogen is one of its elements. Sal-ammoniac is the chloride of ammonium.

**AMMONIACUM**, a gum-resinous exudation from an umbelliferous plant. It has a fetid smell, is inflammable, soluble in water and spirit of wine; used as an antispasmodic, stimulant, and expectorant in chronic catarrh, bronchitic affections, and asthma; also used for plasters.

**AMMONITE**, a fossil Cephalopod, belonging to the genus *Ammonites*, allied to the *Nautilus*, having a many-chambered shell, in shape like the



Ammonites.

curved horns on the ancient statues of Jupiter Ammon; characteristic of the Trias, Lias, and Oolite formations, and sometimes found in immense numbers and of great size.

**AMMONITES**, a Semitic race frequently mentioned in Scripture, descended from Ben-Ammi, the son of Lot (Gen. xix. 38), often spoken of in conjunction with the Moabites. A predatory and Bedouin race, they inhabited the desert country east of Gad, their chief city being Rabbath-Ammon (Philadelphia). Wars between the Israelites and the Ammonites were frequent; they were overcome by Jephthah, Saul, David, Uzziah, Jotham, etc. They appear to have existed as a distinct people in the time of Justin Martyr, but have subsequently become merged in the aggregate of nameless Arab tribes.

**AMMONIUM**, the name given to the hypothetical base of ammonia, analogous to a metal as potassium. It has not been isolated, but it is believed to exist in an amalgam with mercury.

P. E.—4

**AMMUNITION**, military stores generally; in modern usage confined to the articles used in the discharge of firearms and ordnance of all kinds, as powder, balls, shells, various kinds of shot, etc.

**AMNESTY**, the releasing of a number of persons who have been guilty of political offenses from the consequence of these offenses.

**AMOEBA**, a microscopic genus of rhizopodous Protozoa, common in fresh-water ponds and ditches. It exists as a mass of protoplasm, and pushes its body



Amoeba, or fresh-water proteus, showing some of the shapes which it assumes.

out into finger-like processes or pseudopodia, and by means of these moves about or grasps particles of food. There is no distinct mouth, and food is engulfed within any portion of the soft sarcode body. Reproduction takes place by fission, or by a single pseudopodium detaching itself from the parent body and developing into a separate amoeba.

**AMONTILLA'DO**, a dry kind of sherry wine of a light color, highly esteemed.

**AMOO-DARIA**, a Russian territory of central Asia, on the east of the Amoo and southeast of the Sea of Aral; area, 40,000 sq. miles; pop. 220,000.

**AMoor'**, or **AMUR'**, one of the largest rivers of eastern Asia, formed by the junction of the rivers Shilka and Argun; flows first in a southeastern and then in a northeastern direction till it falls into an arm of the Sea of Okhotsk, opposite the island of Saghalien, after a course of 1500 miles. It forms, for a large portion of its course, part of the boundary-line between the Russian and the Chinese dominions, and is navigable throughout for four months in the year.—**Amoor Territory**. In 1858 Russia acquired from China the territory on the left bank of the Upper and Middle Amoor, together with that on both banks of the Lower Amoor. The western portion of the territory was organized as a separate province, with the name of the Amoor (area, 173,559 sq. miles; pop. 87,700). The eastern portion was joined to the Maritime Province of eastern Siberia.

**AMORITES**, a powerful Canaanitish tribe at the time of the occupation of the country by the Israelites; occupied the whole of Gilead and Bashan, and formed two powerful kingdoms—a northern, under Og, who is called king of Bashan; and a southern, under Sihon, called king of the Amorites; first attacked and overthrown by Joshua; subsequently subdued, and made tributary or driven to mingle with the Philistines and other remnants of the Canaanitish nations.

**AMORPHOUS ROCKS** or **MINERALS**, those having no regular structure, or

without crystallization, even in the minutest particles.

**AMORPHOZO'A**, a term applied to some of the lower groups of animals, as the sponges and their allies, which have no regular symmetrical structure.

**AMOY'**, an important Chinese trading port, on a small island off the south-east coast opposite Formosa; has a safe and commodious harbor, and its merchants are among the wealthiest and most enterprising in China; one of the five ports opened to British commerce in 1843, now open to all countries. Pop. 95,600.

**AMPERE** (ān-pār), André-Marie, a celebrated French mathematician and philosopher, founder of the science of electrodynamics, born at Lyons in 1775, died at Marseilles in 1836. What is known as Ampère's Theory is that magnetism consists in the existence of electric currents circulating round the particles of magnetic bodies, being in different directions round different particles when the bodies are unmagnetized, but all in the same direction when they are magnetized.

**AMPHIBIA**, a class of vertebrate animals, which in their early life breathe by gills or branchiæ, and afterward partly or entirely by lungs. The Frog, breathing in its tadpole state by gills and afterward throwing off these organs and breathing entirely by lungs in its adult state, is an example of the latter phase of amphibian existence. The Proteus of the underground caves of central Europe exemplifies forms in which the gills of early life are retained throughout life, and in which lungs are developed in addition to the gills. A second character of this group consists in the presence of two occipital "condyles," or processes by means of



Amphipoda.—1. Shore-jumper; 2. Portion showing the respiratory organs a a.

which the skull articulates with the spine or vertebral column; Reptiles possessing one condyle only. The class is divided into four orders: the Ophiomorpha (or serpentine), represented by the Blind-worms, in which limbs are wanting and the body is snake-like; the Urodela or "Tailed" Amphibians, including the Newts, Proteus, Siren, etc.; the Anoura, or Tailless Amphibia, represented by the Frogs and Toads; and the Labyrinthodontia, which includes the extinct forms known as Labyrinthodonts.

**AMPHI'ON**, in Greek mythology, son of Zeus and Antiopē, and husband of Niobē; had miraculous skill in music, being taught by Mercury, or, according to others, by Apollo. In poetic legend he is said to have availed himself of his skill when building the walls of Thebes—the stones moving and arranging themselves in proper position at the sound of his lyre.

**AMPHIP'ODA**, an order of sessile-eyed crustaceans, with feet directed



partly forward and partly backward. Many species are found in springs and rivulets, others in salt water. The sandhopper and shore-jumper are examples.

**AMPHIPROSTYLE**, in architecture, said of a structure having the form of an ancient Greek or Roman oblong rectangular temple, with a prostyle or portico on each of its ends or fronts, but with no columns on its sides or flanks.

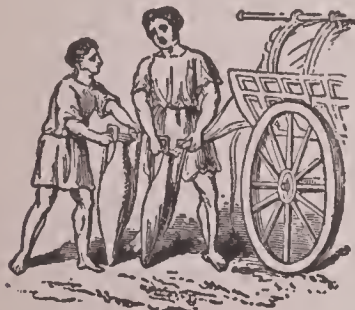
**AMPHISBÆ'NA**, a genus of serpentine, limbless, lacertilian reptiles; body cylindrical, destitute of scales, and divided into numerous annular segments; the tail obtuse, and scarcely to be distinguished from the head, whence the belief that it moved equally well with either end foremost. There are several species, found in tropical America. They feed on ants and earthworms, and were formerly, but erroneously, deemed poisonous.

**AMPHITHE'ATER**, an ancient Roman edifice of an oval form without a roof, having a central area (the arena) encompassed with rows of seats, rising higher as they receded from the center, on which people used to sit to view the combats of gladiators and of wild beasts, and other sports. The Colosseum at Rome is the largest of all the ancient amphitheatres, being capable of containing from 50,000 to 80,000 persons. That at Verona is one of the best examples remaining. Its dimensions are 502 feet by 401, and 98 feet high. The name means "both-ways theater," or "theater all round," the theater forming only a semicircular edifice.

**AMPHITRITE**, in Greek mythology, daughter of Oceanus and Tethys, or of Nereus and Doris, and wife of Poseidon (or Neptune), represented as drawn in a chariot of shells by Tritons, with a trident in her hand.

**AMPHIU'MA**, a genus of amphibians which frequent the lakes and stagnant waters of North America. The adults retain the clefts at which the gills of the tadpole projected.

**AM'PHORA**, a vessel used by the Greeks and Romans for holding liquids; commonly tall and narrow, with two handles and a pointed end which fitted



Filling an amphora.

into a stand or was stuck in the ground to enable them to stand upright; used also as a cinerary urn, and as a liquid measure.

**AM'PLITUDE**, in astronomy, the distance of any celestial body (when referred by a secondary circle to the horizon) from the east or west points.

**AMPUL'LA**, in antiquity, a vessel bellying out like a jug, that contained

unguents for the bath; also a vessel for drinking at table. The ampulla has also been employed for ceremonial purposes, such as holding the oil or chrism used in various church rites and for

Another canal, the North Holland Canal (46 m. long, 20 ft. deep), connects Amsterdam with the Helder. Between the harbor and the Zuider-zee the Y is now crossed by a great dam in which are



Amsterdam—Scene on the Amstel.

anointing monarchs at their coronation. The ampulla of the English sovereigns now in use is an eagle, weighing about 10 oz., of the purest chased gold, which passed through various hands to the Black Prince.

**AMPUTA'TION**, in surgery, that operation by which a member is separated from the body according to the rules of the science.

**AM'RITSIR**, or **AMRITSAR**, a flourishing commercial town of Hindustan, capital of a district of the same name, in the Punjab, the principal place of the religious worship of the Sikhs. It has considerable manufactures of shawls and silks; and receives its name from the sacred pond constructed by Ram Das, the apostle of the Sikhs, in which the Sikhs and other Hindus immerse themselves that they may be purified from all sin. Pop. 162,429.—The district of Amritsir has an area of 1601 miles. Pop. 992,697.

**AM'STERDAM**, one of the chief commercial cities of Europe, capital of Holland (but not the residence of the king), situated at the confluence of the Amstel with the Y or IJ (pronounced as eye), an arm of the Zuider-zee. On account of the lowness of the site of the city the greater part of it is built on piles. It is divided by numerous canals into about 90 islands, which are connected by nearly 300 bridges. Many of the streets have a canal in the middle with broad brick-paved quays on either side, planted with rows of trees; the houses are generally of brick, many of them six or seven stories high, with pointed gables turned to the streets. Among its numerous industries may be mentioned as a specialty the cutting and polishing of diamonds. The harbor, formed by the Y, lies along the whole of the north side of the city, and is surrounded by various docks and basins. The trade is very great, being much facilitated by the great ship-canal (15 m. long, 22-26 ft. deep, constructed 1865-76) which connects the Y directly with the North Sea.

locks to admit vessels and regulate the amount of water in the North Sea Canal. During the 17th and 18th centuries Amsterdam was one of the wealthiest and most flourishing cities in the world. Its forced alliance with France ruined its trade, but since 1813 its commerce has revived. Pop. 520,602.

**AMSTERDAM**, a town of New York state, U. S., on the Mohawk river, 33 miles n.w. of Albany; a busy manufacturing town. Pop. 23,000.

**AM'ULET**, a piece of stone, metal, etc., marked with certain figures or characters, which people in some countries wear about them, superstitiously deeming them a protection against diseases and enchantments.

**AMUR'**. See Amoor.



**AMYG'DALOID**, a term applied to an igneous rock, especially trap, containing round or almond-shaped vesicles or cavities partly or wholly filled with crystalline nodules of various minerals, particularly calcareous spar, quartz, agate, zeolite, chlorite, etc.

**AM'YL**, in chemistry, a hypothetical radical believed to exist in many compounds, especially the fusel-oil series,



and having the formula  $C_6H_{11}$ .—Amyl Nitrite, or Nitrite of Amyl, an amber-colored fluid, smelling and tasting like essence of pears, which has been employed as an anæsthetic and also in relieving cardiac distress, as in angina pectoris.

**AM'YLENE**, an ethereal liquid with an aromatic odor, prepared from fusel-oil. It possesses anæsthetic properties, and has been tried as a substitute for chloroform, but is very dangerous.

**AMYL'IC ALCOHOL**, one of the products of the fermentation of grain, etc., commonly known by the name of fusel-oil (which see).

**AMYRIDA'CEÆ**, a natural order of plants, consisting of tropical trees or shrubs, the leaves, bark, and fruit of which abound in fragrant resinous and balsamic juices. Myrrh, frankincense, and the gum-elemi of commerce are among their products.

**ANABAP'TISTS**, a name given to a Christian sect by their adversaries, because, as they objected to infant baptism, they rebaptized those who joined their body. The founder of the sect appears to have been Nicolas Storch, a disciple of Luther's, who seems to have aimed also at the reorganization of society based on civil and political equality. The application of the term Anabaptist to the general body of Baptists throughout the world is unwarranted, because these sects have nothing in common with the bodies which sprung up in various countries of Europe during the Reformation, except the practice of adult baptism. The Baptists themselves repudiate the name Anabaptist, as they claim to baptize according to the original institution of the rite, and never repeat baptism in the case of those who in their opinion have been so baptized.

**ANAB'ASIS**, the Greek title of Xenophon's celebrated account of the expedition of Cyrus the Younger against his brother Artaxerxes, king of Persia. The title is also given to Arrian's work which records the campaigns of Alexander the Great.

**AN'ABLEPS**, a genus of fishes of the perch family, found in the rivers of Guiana, consisting of but one species, remarkable for a peculiar structure of



Anableps.

the eyes, in which there is a division of the iris and cornea, by transverse ligaments forming two pupils, and making the whole eye appear double. The young are brought forth alive.

**ANACANTH'NI**, an order of osseous fishes, including the cod, plaice, etc., with spineless fins, cycloid or ctenoid scales, the ventral fins either absent or below the pectorals, and ductless swim-bladder.

**ANACH'RONISM**, an error of chronology by which things are represented as coexisting which did not coexist; applied also to anything foreign to or out of keeping with a specified time.

Thus it is an anachronism when Shakespeare, in Troilus and Cressida, makes Hector quote Aristotle.

**ANACON'DA**, the popular name of two of the largest species of the serpent tribe, viz., a Ceylonese species of the genus Python, said to have been met with 33 feet long; and a native of tropical America, allied to the boa-constrictor, and the largest of the serpent tribe, attaining the length of 40 feet. They frequent swamps and rivers, are destitute of poison fangs, and kill their victims by constriction.

**ANACONDA**, a city and county seat of Deer Lodge Co., Mont., 27 miles west by north of Butte, on the Northern Pacific, the Great Northern, and the Butte, Anaconda and Pacific railroads. The city is noted for its great copper-smelting works, which are among the largest in the world, having a daily capacity of some 5500 tons of ore. Railroad shops, foundries, machine shops, and brick works further represent the industrial interests. Pop. 12,000.

**ANÆ'MIA**, a medical term applied to an unhealthy condition of the body, in which there is a diminution of the red corpuscles which the blood should contain. The principal symptoms are paleness and general want of color in the skin, languor, emaciation, want of appetite, fainting, palpitation, etc.

**ANÆSTHET'ICS**, medical agents employed for the removal of pain, especially in surgical operations, by suspending sensibility either locally or generally. Various agents have been employed for both of these purposes from the earliest times, but the scientific use of anæsthetics may be said to date from 1800, when Sir Humphry Davy made experiments on the anæsthetic properties of nitrous oxide, and recommended its use in surgery. In 1818 Faraday established the anæsthetic properties of sulphuric ether, but this agent made no advance beyond the region of experiment, till 1844, when Dr. Wells, a dentist of Hartford, Connecticut, applied the inhalation of sulphuric ether in the extraction of teeth, but owing to some misadventure did not persevere with it. The example was followed in 1846 by Dr. Morton, a Boston dentist, who also extended the use of ether to other surgical operations. The practice was soon after introduced into England by Mr. Liston, and a London dentist, Mr. Robinson. A few weeks later Sir James Simpson made the first application of ether in a case of midwifery. This was early in 1847. Toward the end of the same year Simpson had his attention called to the anæsthetic efficacy of chloroform, and announced it as a superior agent to ether. This agent has since been the most extensively used anæsthetic, though the use of ether still largely prevails in the United States. In their general effects ether and chloroform are very similar; but the latter tends to enfeeble the action of the heart more readily than the former. For this reason great caution has to be used in administering chloroform where there is weak heart action from disease. Local anæsthesia is produced by isolating the part of the

body to be operated upon, and producing insensibility of the nerves in that locality. Dr. Richardson's method is to apply the spray of ether, which, by its rapid evaporation, chills and freezes the tissues and produces complete anæsthesia. This mode of treatment, besides its use in minor surgical operations, has recently begun to have important remedial applications. A valuable local anæsthetic now employed is cocaine.

**AN'AGRAM**, the transposition of the letters of a word or words so as to form a new word or phrase, a connection in meaning being frequently preserved; thus, evil, vile; Horatio Nelson, Honor est a Nilo (honor is from the Nile).

**AN'ALOGUE**, in comparative anatomy, an organ in one species or group having the same function as an organ of different structure in another species or group, as the wing of a bird and that of an insect, both serving for flight. Organs in different animals having a similar anatomical structure, development, and relative position, independent of function or form, such as the arm of a man and the wing of a bird, are termed homologues.

**ANAL'OGY** is the mode of reasoning from resemblance to resemblance. When we find on attentive examination resemblances in objects apparently diverse, and in which at first no such resemblances were discovered, a presumption arises that other resemblances may be found by further examination in these or other objects likewise apparently diverse. It is on the belief in a unity in nature that all inferences from analogy rest. The general inference from analogy is always perfectly valid. Wherever there is resemblance, similarity or identity of cause somewhere may be justly inferred; but to infer the particular cause without particular proof is always to reason falsely. Analogy is of great use and constant application in science, in philosophy, and in the common business of life.

**ANAL'YSIS**, the resolution of an object, whether of the senses or the intellect, into its component elements. In philosophy it is the mode of resolving a compound idea into its simple parts, in order to consider them more distinctly, and arrive at a more precise knowledge of the whole. It is opposed to synthesis, by which we combine and class our perceptions, and contrive expressions for our thoughts, so as to represent their several divisions, classes, and relations.

Analysis, in mathematics, is, in the widest sense, the expression and development of the functions of quantities by calculation; in a narrower sense the resolving of problems by algebraic equations. The analysis of the ancients was exhibited only in geometry, and made use only of geometrical assistance, whereby it is distinguished from the analysis of the moderns, which extends to all measurable objects, and expresses in equations the mutual dependence of magnitudes. Analysis is divided into lower and higher, the lower comprising, besides arithmetic and algebra, the doctrines of functions, of series, combinations, logarithms, and curves, the higher comprising the differential and in-



tegral calculus, and the calculus of variations.

In chemistry, analysis is the process of decomposing a compound substance with a view to determine either (a) what elements it contains (qualitative analysis), or (b) how much of each element is present (quantitative analysis). Thus by the first process we learn that water is a compound of hydrogen and oxygen, and by the second that it consists of one part of hydrogen by weight to eight parts of oxygen.

**ANAM'**, a country of Asia occupying the e. side of the Southeastern or Indo-Chinese Peninsula, along the China Sea, having a length of about 850 miles, with a breadth varying from over 400 miles in the n. to 100 in the middle. It is composed of three parts: Tonquin in the n.; Cochinchina in the s.; and the territory of the Laos tribes, s.w. of Tonquin (together, area, 170,000 square miles, pop. 15,000,000, 9,000,000 being in Tonquin).

**AN'ANAS.** See Pineapple.

**AN'ARCHISTS**, a revolutionary sect or body setting forth as the social ideal the extreme form of individual freedom, and holding that all government is injurious and immoral, that the destruction of every social form now existing must be the first step to the creation of a new world. Their recognition as an independent sect may be dated from the secession of Bakunin and his followers from the Social Democrats at the congress of the Hague in 1872, since which they have maintained an active propaganda. Their principal journals have been *La Révolte* (Paris), the *Freiheit* (New York), *Liberty* (Boston), and the *Anarchist* (London). The congress at London in 1881 decided that all means were justifiable as against the organized forces of modern society.

Much disputation arises from the confusion of anarchists with nihilists and with socialists. On the other hand, philosophical anarchism is confounded with revolutionary anarchism. Anarchists of the latter type have during the past 25 years assassinated, or attempted to assassinate, numerous rulers or heads of government, but in every case they have paid the death penalty for the deed. The most notable anarchistic demonstration was that of the Haymarket Square riot of Chicago on May 4, 1886, in which 7 policemen were killed and 60 wounded. Philosophical anarchism does not countenance the use of violence, but holds that human society will eventually evolve into a state in which there will be no need of any kind of government. Its foremost apostle was Herbert Spencer.

**ANARTHROPODA**, one of the two great divisions (the Arthropoda being the other) of the Annulosa, or ringed animals, in which there are no articulated appendages. It includes the leeches, earthworms, tubeworms, etc.

**A'NAS**, a genus of web-footed birds, containing the true ducks.

**ANATH'EMA**, originally a gift hung up in a temple and dedicated to some god, a votive offering; but it gradually came to be used for expulsion, curse. The Roman Catholic Church pronounces the sentence of anathema against heretics, schismatics, and all who wilfully pursue

a course of conduct condemned by the church. The subject of the anathema is declared an outcast from the church, all the faithful are forbidden to associate with him, and utter destruction is denounced against him, both body and soul.

**ANAT'IDÆ**, a family of swimming birds, including the ducks, swans, geese, etc.

**ANAT'OMY**, in the literal sense, means simply a cutting up, but is now generally applied both to the art of dissecting or artificially separating the different parts of an organized body (vegetable or animal) with a view to discover their situation, structure, and economy; and to the science which treats of the internal structure of organized bodies. The branch which treats of the structure of plants is called vegetable anatomy or phytotomy, and that which treats of the structure of animals animal anatomy or zootomy, a special branch of the latter being human anatomy or anthropotomy. Comparative anatomy is the science which compares the anatomy of different classes or species of animals, as that of man with quadrupeds, or that of quadrupeds with fishes; while special anatomy treats of the construction, form, and structure of parts in a single animal. The special anatomy of an animal may be studied from various standpoints: with relation to the succession of forms which it exhibits from its first stage to its adult form (developmental or embryotical anatomy), with reference to the general properties and structure of the tissues or textures (general anatomy, histology), with reference to the changes in structure of organs or parts produced by disease and congenital malformations (morbid or pathological anatomy), or with reference to the function, use, or purpose performed by the organs or parts (teleological or physiological anatomy). According to the parts of the body described the different divisions of human anatomy receive different names; as, osteology, the description of the bones; myology, of the muscles; desmology, of the ligaments and sinews; splanchnology, of the viscera or internal organs, in which are reckoned the lungs, stomach, and intestines, the liver, spleen, kidneys, bladder, pancreas, etc. Angiology describes the vessels through which the liquids in the body are conducted, including the blood-vessels, which are divided into arteries and veins, and the lymphatic vessels, some of which absorb matters from the bowels, while others are distributed through the whole body, collecting juices from the tissues and carrying them back into the blood. Neurology describes the system of the nerves and of the brain; dermatology treats of the skin.

Among the ancient writers or authorities on human anatomy may be mentioned Hippocrates the younger (460-377 B.C.), Aristotle (384-322 B.C.), Herophilus and Erasistratus of Alexandria (fl. about 300 B.C.), Celsus (53 B.C.-37 A.D.), and Galen of Pergamus (140-200), the most celebrated of all the ancient authorities on the science. From his time till the revival of learning in Europe in the 14th century

anatomy was checked in its progress. In 1315 Mondino, professor at Bologna, first publicly performed dissection, and published a *System of Anatomy*, which was a text-book in the schools of Italy for about 200 years. In the 16th century Fallopio of Padua, Eustachi of Venice, Vesalius of Brussels, Varoli of Bologna, and many others, enriched anatomy with new discoveries. In the 17th century Harvey discovered the circulation of the blood, Asellius discovered the manner in which the nutritious part of the food is conveyed into the circulation, while the lymphatic system was detected and described by the Dane T. Bartoline. Among the renowned anatomists of later times we can only mention Malpighi, Boerhaave, William and John Hunter, the younger Meckel, Bichat, Rosenmüller, Quain, Sir A. Cooper, Sir C. Bell, Carus, Joh. Müller, Häckel, Gegenbaur, Owen, and Huxley.

**ANAXAG'ORAS**, an ancient Greek philosopher of the Ionic school, born at Clazomenæ, in Ionia, probably about 500 B.C. When only about twenty years of age he settled at Athens, and soon gained a high reputation, and gathered round him a circle of renowned pupils, including Pericles, Euripides, Socrates, etc. At the age of fifty he was publicly charged with impiety and condemned to death, but the sentence was commuted to perpetual banishment. He thereupon went to Lampsacus, where he died about 428. Anaxagoras belonged to the atomic school of Ionic philosophers. He held that there was an infinite number of different kinds of elementary atoms, and that these, in themselves motionless and originally existing in a state of chaos, were put in motion by an eternal, immaterial, spiritual, elementary being, *Nous* (Intelligence), from which motion the world was produced. The stars were, according to him, of earthy materials; the sun a glowing mass, about as large as the Peloponnesus; the earth was flat; the moon a dark, inhabitable body, receiving its light from the sun; the comets wandering stars.

**ANAXIMAN'DER**, an ancient Greek (Ionic) philosopher, was born at Miletus in 611 B.C., and died 547. The fundamental principle of his philosophy is that the source of all things is an undefined substance infinite in quantity. The firmament is composed of heat and cold, the stars of air and fire. The sun occupies the highest place in the heavens, has a circumference twenty-eight times larger than the earth, and resembles a cylinder, from which streams of fire issue. The moon is likewise a cylinder, nineteen times larger than the earth. The earth has the shape of a cylinder, and is placed in the midst of the universe, where it remains suspended. Anaximander occupied himself a great deal with mathematics and geography. To him is credited the invention of geographical maps and the first application of the gnomon or style fixed on a horizontal plane to determine the solstices and equinoxes.

**ANAXIMENES** (an-aks-im'e-nêz) **OF MILETUS**, an ancient Greek philosopher, according to whom air was the first principle of all things. Finite things



were formed from the infinite air by compression and rarefaction produced by eternally existent motion; and heat and cold resulted from varying degrees of density of the primal element. He flourished about 550 B.C.

**AN'CHOR**, an implement for holding a ship or other vessel at rest in the water. In ancient times large stones or crooked pieces of wood heavily weighted with metal were used for this purpose. The



Anchor.

anchor now used is of iron, formed with a strong shank, at one extremity of which is the crown, from which branch out two arms, terminating in broad palms or flukes, the sharp extremity of which is the peak or bill; at the other end of the shank is the stock (fixed at right angles to the plane of the arms), behind which is the ring, to which a cable can be attached. The principal use of the stock is to cause the arms to fall so as one of the flukes shall enter the ground.

**AN'CHORITES**, in the early church a class of religious persons who generally passed their lives in cells, from which they never removed. Their habitations were, in many instances, entirely separated from the abodes of other men, sometimes in the depth of wildernesses, in pits or caverns; at other times several of these individuals fixed their habitations in the vicinity of each other, but they always lived personally separate. The continual prevalence of bloody wars, civil commotions, and persecutions at the beginning of the Christian era must have made retirement and religious meditation agreeable to men of quiet and contemplative minds. This spirit, however, as might have been expected, soon led to fanatical excesses; many anchorites went without proper clothing, wore heavy chains, and we find at the close of the 4th century Simeon Stylites passing thirty years on the top of a column without ever descending from it, and finally dying there. In Egypt and Syria, where Christianity became blended with the Grecian philosophy and strongly tinged with the peculiar notions of the East, the anchorites were most numerous; in Europe there were comparatively few, and on the development and establishment of the monastic system they completely disappeared.

**ANCHOVY** (an-chō'vi), a small fish of the Herring family. The common anchovy, so esteemed for its rich and peculiar flavor, is not much larger than the middle finger. It is caught in vast numbers in the Mediterranean, and frequently on the coasts of France, Holland, and the south of England, and pickled for exportation. A favorite sauce is made by pounding the pickled fish in water, simmering for a short time, adding a little cayenne pepper, and straining the whole through a hair-sieve.

**ANCO'NA**, a seaport of Italy, capital of the province of the same name, on the Adriatic, 130 miles n.e. of Rome, with harbor works begun by Trajan, who built the ancient mole or quay. A triumphal arch of white marble, erected in honor of Trajan, stands on the mole. The harbor, once the finest on the coast, has been recently improved; Ancona is now a station of the Italian fleet, and the commerce is increasing. The town is indifferently built, but has some remarkable edifices; among others, the cathedral. There is a colossal statue of Count Cavour. Pop. 56,825.—The province has an area of 740 square miles, and a population of 302,460.

**ANDALU'SIA**, a large and fertile district in the south of Spain, bounded n. by Estramadura and New Castile, e. by Murcia, s. by the Mediterranean Sea, and w. by Portugal and the Atlantic; area, about 33,650 sq. miles, including the modern provinces of Seville, Huelva, Cadiz, Jaen, Cordova, Granada, Almeria, and Malaga. It is traversed throughout its whole extent by ranges of mountains, the loftiest being the Sierra Nevada, many summits of which are covered with perpetual snow (Mulhacen is 11,678 feet). Minerals abound, and several mines have been opened by English companies, especially in the province of Huelva, where the Tharsis and Rio Tinto copper-mines are situated. The principal river is the Guadalquivir. The vine, myrtle, olive, palm, banana, carob, etc., grow abundantly in the valley of the Guadalquivir. Wheat, maize, barley, and many varieties of fruit grow almost spontaneously; besides which honey, silk, and cochineal form important articles of culture. The horses and mules are the best in the Peninsula; the bulls are sought for bull-fighting over all Spain; sheep are reared in vast numbers. Agriculture is in a backward state, and the manufactures are by no means extensive. The Andalusians are descended in part from the Moors, of whom they still preserve decided characteristics. Pop. 3,282,448.

**AN'DAMANS**, a chain of islands on the east side of the Bay of Bengal, the principal being the North, Middle, South, and Little Andamans. Middle Andaman is about 60 miles long, and 15 or 16 miles broad; North and South Andaman are each about 50 miles long. The inhabitants are about 10,000 in number, and are mostly in a state of nature, living almost naked in the rudest habitations. They are small, generally much less than 5 feet, well-formed, and active, skilful archers and canoeists, and excellent swimmers and divers. These islands have been used since 1858 as a penal settlement by the Indian government, the settlement being at Port Blair, on South Andaman.

**ANDANTE** (an-dan'tā), in music, denotes a movement somewhat slow, graceful, distinct, and soothing. The word is also applied substantively to that part of a sonata or symphony having a movement of this character.

**AN'DERSEN**, Hans Christian, a Danish novelist, poet, and writer of fairy tales, was born of poor parents at Odense, 2d April, 1805. In 1835 ap-

peared the first volume of his *Fairy Tales*, of which successive volumes continued to be published year by year at Christmas, and which have been the most popular and wide-spread of his works. He died 4th August, 1875, having had the pleasure of seeing many of his works translated into most of the European languages.

**ANDERSEN**, Mary Antoinette, an American actress, born at Sacramento, Cal., in 1859, but reared in Kentucky. Educated in convents of the Roman Catholic Church, of which church she is a devout member. She made her debut as Juliet at Louisville in 1875. Her first visit to the East was made in 1877, and her success there was immediate. In 1884-5 she visited London and was well received. Her principal rôles were Rosalind in *As You Like It*, Julia in *The Hunchback*, Meg Merri- lies, Perdita in *Winter's Tale*, Evadne, and Juliet. In 1890 she was married to Antonio Navarro de Viana and has since her marriage resided in England.

**AN'DERSON**, a city and railroad center, the county seat of Madison Co., Ind., 36 miles northeast of Indianapolis, on the west fork of the White River, and the Chicago and Southeastern, the Cleveland, Cincinnati, Chicago and St. Louis, and other railroads. An abundant supply of natural gas promotes the manufacturing industries, which include iron, steel, glass, wire nails, strawboards, tiles, etc. The city is the center of an extensive system of interurban electric railways. Near the city are the historic mounds of the so-called "mound builders." Pop. 23,000.

**ANDERSON**, Rasmus Björn, an American author and diplomat, born in Wisconsin in 1846. From 1875 to 1883 he taught Scandinavian languages and literature in the University of Wisconsin and from 1885 to 1889 was U. S. minister to Denmark. He has published several works on Scandinavian subjects.

**ANDERSON**, Robert, a Scotch author, born in 1750, died 1830. His principal work is a comprehensive compilation of the British poets.

**ANDES** (an'dēz), or, as they are called in Spanish South America, Cordilleras de los Andes, or simply Cordilleras, a range of mountains stretching along the whole of the west coast of South America, from Cape Horn to the Isthmus of Panama and the Caribbean Sea. In absolute length (4500 miles) no single chain of mountains approaches the Andes, and only a certain number of the higher peaks of the Himalayan chain rise higher above the sea-level; which peak is the highest of all is not yet settled. Several main sections of this huge chain are distinguishable. The Southern Andes present a lofty main chain, with a minor chain running parallel to it on the east, reaching from Tierra del Fuego and the Straits of Magellan, northward to about lat. 28° s., and rising in Aconcagua to a height of 22,860 feet. North of this is the double chain of the Central Andes, inclosing the wide and lofty plateaux of Bolivia and Peru, which lie at an elevation of more than 12,000 feet above the sea. The mountain system is here at its



broadest, being about 500 miles across. Here are also several very lofty peaks, as Illampu or Sorata (21,484 feet), Sahama (21,054), Illimani (21,024). Farther north the outer and inner ranges draw closer together, and in Ecuador there is but a single system of elevated masses, generally described as forming two parallel chains. In this section are crowded together a number of lofty peaks, most of them volcanoes, either extinct or active. Of the latter class are Pichincha (15,918 feet), with a crater 2500 feet deep; Tunguragua (16,685 feet); Sangay (17,460 feet); and Cotopaxi (19,550 feet). The loftiest summit here appears to be Chimborazo (20,581 feet); others are Antisana (19,260 feet) and Cayambe (19,200 feet). Northward of this section the Andes break into three distinct ranges, the eastmost running northeastward into Venezuela, the westmost running northwestward to the Isthmus of Panama. In the central range is the volcano of Tolima (17,660 feet). The western slope of the Andes is generally exceedingly steep, the eastern much less so, the mountains sinking gradually to the plains. The whole range gives evidence of volcanic action, but it consists almost entirely of sedimentary rocks. Thus mountains may be found rising to the height of over 20,000 feet, and fossiliferous to their summits (as Illimani and Sorata or Illampu). There are about thirty volcanoes in a state of activity. The loftiest of these burning mountains seems to be Gualateiri, in Peru (21,960 feet). The heights of the others vary from 13,000 to 20,000 feet. All the districts of the Andes system have suffered severely from earthquakes, towns having been either destroyed or greatly injured by these visitations. Peaks crowned with perpetual snow are seen all along the range, and glaciers are also met with, more especially from Aconcagua southward. The passes are generally at a great height, the most important being from 10,000 to 15,000 feet. Railways have been constructed to cross the chain at a similar elevation. The Andes are extremely rich in the precious metals, gold, silver, copper, platinum, mercury, and tin all being wrought: lead and iron are also found. The llama and its congeners—the guanaco, vicuña, and alpaca—are characteristic of the Andes. Among birds, the condor is the most remarkable. The vegetation necessarily varies much according to elevation, latitude, rainfall, etc., but generally is rich and varied. Except in the south and north little rain falls on the western side of the range, and in the center there is a considerable desert area. On the east side the rainfall is heavy in the equatorial regions, but in the south is very scanty or altogether deficient. From the Andes rise two of the largest water systems of the world—the Amazon and its affluents, and the La Plata and its affluents. Besides which, in the north, from its slopes flow the Magdalena to the Caribbean Sea, and some tributaries to the Orinoco. The mountain chain pressing so close upon the Pacific Ocean, no streams of importance flow from its western slopes. The number

of lakes is not great; the largest and most important is that of Titicaca on the Bolivian plateau. In the Andes are towns at a greater elevation than anywhere else in the world, the highest being the silver mining town of Cerro de Pasco (14,270 feet), the next being Potosi.

**ANDIRON** (an'di-ern), a horizontal iron bar raised on short legs, with an upright standard at one end, used to support pieces of wood when burning in an open hearth, one andiron being placed on each side of the hearth.

**AN'DOVER**, a town in Massachusetts, 25 miles n.n.w. of Boston, chiefly remarkable for its literary institutions—Phillip's Academy, founded in 1778; the Andover Theological Seminary, founded in 1807; and a female academy founded in 1829. Pop. 6142.

**ANDRASSY** (an-dra'shē), Count Julius, Hungarian statesman, born 1823; took part in the revolution of 1848, was condemned to death, but escaped and went into exile; appointed premier when self-government was restored to Hungary in 1867; became imperial minister for foreign affairs in 1871; retired from public life 1879; died 1890.

**ANDRE** (an'drā), Major John, adjutant-general in the British army during the American revolutionary war. Employed to negotiate the defection of the American general Arnold, and the delivery of the works at West Point, he



Major André.

was apprehended in disguise, September 23, 1780, within the American lines; declared a spy from the enemy, and hanged Oct. 2, 1780. His remains were taken to England in 1821 and interred in Westminster Abbey, where a monument has been erected to his memory.

**AN'DREW**, John Albion, governor of Massachusetts during the civil war. He was born in Maine in 1818, and became a lawyer in Boston. Having been elected governor in 1860, he perfected a state militia, so that when the war broke out Massachusetts was entirely prepared for the call. He retired in 1866, after being reelected for each succeeding term, and he died in 1867.

**AN'DREW**, St., brother of St. Peter, and the first disciple whom Christ chose. He is said to have preached in Scythia, in Thrace and Asia Minor, and in Achaia (Greece), and according to tradition he was crucified at Patræ, now Patras, in Achaia, on a cross of the form X. Hence such a cross is now known as a St. Andrew's cross. The Russians

revere him as the apostle who brought the gospel to them; the Scots, as the patron saint of their country. The day dedicated to him is the 30th of November. The Russian order of St. Andrew, the highest of the empire, was instituted by Peter the Great in 1698. For the Scottish Knights of St. Andrew or the Thistle, see Thistle.

**ANDREWS**, Elisha Benjamin, an educator and present chancellor of the University of Nebraska. Born in New Hampshire, in 1844, he fought on the Union side during the civil war. He was educated at Brown University and at Newton Theological Institution, and, after teaching in numerous schools, Cornell University among them, he became president of Brown in 1889. In 1898 he resigned because of the hostility he aroused by his advocacy of free silver, and, after two years' service as superintendent of schools in Chicago, he was appointed to the chancellorship of the University of Nebraska. He is the author of several text-books.

**AN'DREWS**, St., an ancient city and parliamentary burgh in Fifeshire, Scotland, 31 miles northeast from Edinburgh; was erected into a royal burgh by David I. in 1140, and after having been an episcopal, became an archiepiscopal see in 1472, and was for long the ecclesiastical capital of Scotland. The cathedral, now in ruins, was begun about 1160, and took 157 years to finish. The old castle, founded about 1200, and rebuilt in the 14th century, is also an almost shapeless ruin. In it James III. was born and Cardinal Beaton assassinated, and in front of it George Wishart was burned. The University of St. Andrews, the oldest of the Scotch universities, founded in 1411, consists of the united colleges of St. Salvator and St. Leonard and the college of St. Mary, both at St. Andrews, and embraces also University College, Dundee. In 1579 the colleges of St. Salvator and St. Leonard were restricted to the teaching of arts and medicine, and that of St. Mary to theology. In 1747 the two former colleges were united by act of parliament. University College, Dundee, was founded in 1880. Pop. 7621.

**AN'DREWS**, William Draper, an American inventor, born in Massachusetts in 1818, died in 1896. He invented the centrifugal pump in 1844, and subsequently improved upon it, securing numerous patents, from which he derived a large revenue.

**AN'DRIA**, a town of South Italy, province of Bari, with a fine cathedral, founded in 1046; the church of Sant'Agostino, with a beautiful pointed Gothic portal; a college; manufactures of majolica, and a good trade. Pop. 37,192.

**ANDROMACHE** (an-drom'a-kē), in Greek mythology, wife of Hector, one of the most attractive female characters of Homer's Iliad. The passage describing her parting with Hector when he was setting out to his last battle is well known and much admired. Euripides and Racine have made her the chief character of tragedies.

**ANDROM'EDA**, in Greek mythology, daughter of the Ethiopian king Cepheus and of Cassiopeia. Cassiopeia having boasted that her daughter surpassed the



Nereids, if not Hēra (Juno) herself, in beauty, the offended goddesses prevailed on their father, Poseidōn (Neptune), to afflict the country with a horrid sea-monster, which threatened universal destruction. To appease the offended god, Andromeda was chained to a rock, but was rescued by Perseus; and after death was changed into a constellation.

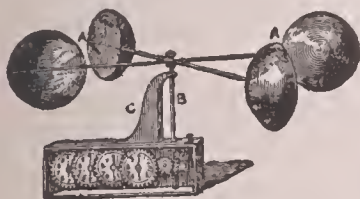
**ANDRONICUS**, the name of four emperors of Constantinople: **ANDRONICUS I.**, Comnenus, born 1110, murdered 1185.—**ANDRONICUS II.**, Palæologus, born 1258, died 1332. His reign is celebrated for the invasion of the Turks.—**ANDRONICUS III.**, Palæologus the Younger, born 1296, died 1341.—**ANDRONICUS IV.**, Palæologus, reigned in the absence of John IV. In 1373 he gave way to his brother Manuel, and died a monk.

**ANDROS ISLANDS**, a group of isles belonging to the Bahamas, lying southwest of New Providence, not far from the east entrance to the Gulf of Florida. The passages through them are dangerous.

**ANECDOTE**, originally some particular relative to a subject not noticed in previous works on that subject; now any particular or detached incident or fact of an interesting nature; a single passage of private life.

**ANELECTRODE**, the positive pole of a galvanic battery.

**ANEMOMETER**, an instrument for measuring the force and velocity of the wind. This force is usually measured by the pressure of the wind upon a square plate attached to one end of a



Anemometer.

spiral spring (with its axis horizontal), which yields more or less according to the force of the wind, and transmits its motion to a pencil which leaves a trace upon paper moved by clockwork. For indicating the velocity of the wind, the instrument which has yielded the best results consists of four hemispherical cups A attached to the ends of equal horizontal arms, forming a horizontal cross which turns freely about a vertical axis B, which is strengthened and supported at C. By means of an endless screw D carried by the axis a train of wheel-work is set in motion; and the indication is given by a hand which moves round a dial; or in some instruments by several hands moving round different dials like those of a gas-meter. It is found that the center of each cup moves with a velocity which is almost exactly one-third of that of the wind. There are various other forms of instruments, one of which is portable, and is especially intended for measuring the velocity of currents of air passing through mines, and the ventilating spaces of hospitals and other public buildings. The direction of the wind

as indicated by a vane can also be made to leave a continuous record by various contrivances; one of the most common being a pinion carried by the shaft of a vane, and driving a rack which carries a pencil.

**ANEMONE**, wind-flower, a genus of plants belonging to the Buttercup family, containing many species, found in temperate regions.

**ANEMONE**, Sea. See Sea-anemone.

**ANEROID BAROMETER**. See Barometer.

**ANEURISM**, the dilatation or expansion of some part of an artery. Aneurisms arise partly from the too violent motion of the blood, and partly from degenerative changes occurring in the coats of the artery diminishing their elasticity. They are therefore more frequent in the great branches; in particular, in the vicinity of the heart, in the arch of the aorta, and in the extremities, where the arteries are exposed to frequent injuries by stretching, violent bodily exertions, thrusts, falls, and contusions. An internal aneurism may burst and cause death.

**ANGEL**, one of those spiritual intelligences who are regarded as dwelling in heaven and employed as the ministers or agents of God. To these the name of good angels is sometimes given, to distinguish them from bad angels, who were originally created to occupy the same blissful abode, but lost it by rebellion. Scripture frequently speaks of angels, but with great reserve, Michael and Gabriel alone being mentioned by name in the canonical books, while Raphael is mentioned in the Apocrypha. The angels are represented in Scripture as in the most elevated state of intelligence, purity, and bliss, ever doing the will of God so perfectly that we can seek for nothing higher or better than to aim at being like them. There are indications of a diversity of rank and power among them, and something like angelic orders. They are represented as frequently taking part in communications made from heaven to earth, as directly and actively ministering to the good of believers, and shielding or delivering them from evils incident to their earthly lot. That every person has a good and a bad angel attendant on him was an early belief, and is held to some extent yet. Roman Catholics show a certain veneration or worship to angels, and beg their prayers and their kind offices; Protestants consider this unlawful.

**ANGEL-FISH**, a fish nearly allied to the sharks, very ugly and voracious, preying on other fish. It is from 6 to 8 feet long, and takes its name from its pectoral fins, which are very large, extending horizontally like wings when spread. This fish connects the rays with the sharks, but it differs from both in having its mouth placed at the extremity of the head. It is common on the south coasts of Britain, and is also called Monk-fish and Fiddle-fish.

**ANGELICO** (ân-jel'i-kō), Fra, the common appellation of Fra Giovanni da Fiesole, one of the most celebrated of the early Italian painters. Born 1387, he entered the Dominican order in 1407, and was employed by Cosmo de Medici in painting the monastery of St. Mark

and the church of St. Annunziata with frescos. These pictures gained him so much celebrity that Nicholas V. invited him to Rome, to ornament his private chapel in the Vatican, and offered him the archbishopric of Florence, which was declined. He died at Rome 1455.

**ANGELO** (ân'je-lō), Michael. See Buonarrotti.

**ANGELUS**, in the Rom. Cath. Church, a short form of prayer in honor of the incarnation, consisting mainly of versicles and responses, the angelic salutation three times repeated, and a collect, so named from the word with which it commences, "Angelus Domini" (Angel of the Lord). Hence, also, the bell tolled in the morning, at noon, and in the evening to indicate the time when the angelus is to be recited.

**ANGER**, an emotion of an aggressive, destructive, or vindictive character against the thing or person causing it. According to Bain the emotion is pleasant (except where it is introduced by too great a shock, or where the consciousness of moral obliquity counteracts the pleasantness) and develops by an expansion—both mental and physical—of the individual. As the agent of justice, the angered person acquires an amount of self-esteem, which is reflected in a tendency to muscular activity, deepened respiration, and aggressive postures. On the other hand, when anger is complicated by the emotions of fear, hatred, envy, or jealousy, or when it is baffled, it acquires a different character. It then becomes unpleasantly toned, is accompanied by choking and stuffiness, trembling and weakness, and a loss of muscular force. But even in anger which is intrinsically unpleasant, a successful termination of the attempt to injure the object of the emotion brings a moment of satisfaction and pleasure, as in the humiliation of a rival.

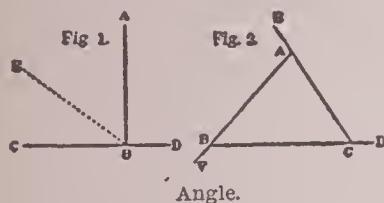
**ANGERS** (ân-zhā), a town and river-port of France, capital of the department of Maine-et-Loire, and formerly of the province of Anjou, on the banks of the Maine, 5½ miles from the Loire, 150 miles southwest of Paris. In the neighborhood are immense slate quarries. Pop. 82,966.

**ANGINA PECTORIS** (an-jī'na pek'toris), or **HEART-SPASM**, a disease characterized by an extremely acute constriction, felt generally in the lower part of the sternum, and extending along the whole side of the chest and into the corresponding arm, a sense of suffocation, faintness, and apprehension of approaching death: seldom experienced by any but those with organic heart-disease. The disease rarely occurs before middle age and is more frequent in men than in women. Those liable to attack must lead a quiet, temperate life, avoiding all scenes which would unduly rouse their emotions. The first attack is occasionally fatal, but usually death occurs as the result of repeated seizures. The paroxysm may be relieved by opiates, or the inhalation, under due precaution, of anæsthetic vapors.

**ANGLE**, the point where two lines meet, or the meeting of two lines in a point. A plane rectilineal angle is



formed by two straight lines which meet each other, but are not in the same straight line; it may be considered the degree of opening or divergence of the two straight lines which thus meet each other. A right angle is an angle formed by a straight line falling on another perpendicularly, or an angle which is measured by an arc of 90 degrees. When a straight line, as A B (fig. 1), standing on another straight line C D, makes the two angles A B C and



A B D equal to each other, each of these angles is called a right angle. An acute angle is that which is less than a right angle, as E B C. An obtuse angle is that which is greater than a right angle, as E B D. Acute and obtuse angles are both called oblique, in opposition to right angles. Exterior or external angles, the angles of any rectilinear figure without it, made by producing the sides; thus, if the sides A B, B C, C A of the triangle A B C (fig. 2) be produced to the points F D E, the angles C B F, A C D, B A E are called exterior or external angles. A solid angle is that which is made by more than two plane angles meeting in one point and not lying in the same plane, as the angle of a cube. A spherical angle is an angle on the surface of a sphere, contained between the arcs of two great circles which intersect each other.

**ANGLER**, also from its habits and appearance called Fishing-frog and Sea-devil, a remarkable fish often found on the British coasts. It is from 3 to 5 feet long; the head is very wide, depressed, with protuberances, and bearing long separate movable tendrils; the mouth is capacious, and armed with formidable teeth. Its voracity is extreme, and it is said to lie concealed in the mud, and attract the smaller fishes within its reach by gently waving the filamentous appendages on its head.

**ANGLES**, a Low German tribe who in the earliest historical period had their seats in the district about Angeln, in the duchy of Sleswig, and who in the 5th century and subsequently crossed over to Britain along with bands of Saxons and Jutes (and probably Frisians also), and colonized a great part of what from them has received the name of England, as well as a portion of the Lowlands of Scotland. The Angles formed the largest body among the Germanic settlers in Britain, and founded the three kingdoms of East Anglia, Mercia, and Northumbria.

**ANGLESEY** (ang'gl-sē), an island and county of North Wales, in the Irish Sea, separated from the mainland by the Menai Strait; 20 miles long and 17 miles broad; area, 193,511 acres. The Menai Strait is crossed by a magnificent suspension-bridge, 580 feet between the piers and 100 feet above high-water

mark, and also by the great Britannia Tubular Railway Bridge. Pop. 50,590.

**ANGLICAN CHURCH**, a term which strictly embraces only the Church of England and the Protestant episcopal churches in Ireland, Scotland, and the colonies, but is sometimes used to include also the episcopal churches of the United States. The doctrines of the Anglican Church are laid down in the Thirty-nine Articles, and its ritual is contained in the Book of Common Prayer. Within the body there is room for considerable latitude of belief and doctrine, and three sections are sometimes spoken of by the names of the High Church, Low Church, and Broad Church.

**ANGLING**, the art of catching fish with a hook or angle baited with worms, small fish, flies, etc.

**ANGLOMANIA**, the manner which affects to imitate the English. Anglomania has been common in Europe many times during the past three or four centuries. It was raging in France previously to the revolution, and has been very fashionable in Germany. In the United States Anglomania has had its exemplars from time out of mind. Today, especially in Boston and New York, and in less degree in the cities of the middle west and west, an English manner and English accent are regarded as the very best form.

**ANGLO-SAXONS**, the name commonly given to the nation or people formed by the amalgamation of the Angles, Saxons, and Jutes, who settled in Britain in the 5th and 6th centuries after Christ, the Anglo-Saxons being simply the English people of the earlier period of English history. The tribes who were thus the ancestors of the bulk of the English-speaking nationalities came from north Germany, where they inhabited the parts about the mouths of the Elbe and Weser, and the first body of them who gained a footing in Britain are said to have landed in 449, and to have been led by Hengist and Horsa. From the preponderance of the Angles the whole country came to be called Engla-land, that is, the land of the Angles or English.

**ANGO'LA**, a Portuguese territory in western Africa, south of the Congo, the name being applied sometimes to the whole Portuguese territory here from about lat. 6° s. to lat. 17° s. (area, 300,000 sq. m.; pop. 2,000,000). The principal town is the seaport of St. Paul de Loanda, which was long the great Portuguese slave-mart. Exports ivory, palm-oil, coffee, hides, gum, wax, etc. Pop. 600,000.

**ANGO'RA**, a town in the interior of Asiatic Turkey, 215 miles e.s.e. of Constantinople. All the animals of this region are long-haired, especially the goats (see Goat), sheep, and cats. This hair forms an important export as well as the fabric called camlet here manufactured from it; other exports being goats' skins, dye-stuffs, gums, honey and wax, etc. A railway connects it with Skutari. Pop. 35,000.

**ANGORA CAT**, the large and long-haired white variety of the common cat, said to belong originally to Angora.

**ANGORA GOAT**, a variety of the common goat with long silky hair. See Goat.

**ANGOSTURA BARK**, the aromatic bitter medicinal bark obtained chiefly



Angostura-bark tree.

from a tree of 10 to 20 feet high, growing in the northern regions of South America. The bark is valuable as a tonic and febrifuge, and is also used for a kind of bitters.

**ANGOULEME** (ang-gō-lām), an ancient town of western France, capital of dep. Charente, on the Charente, 60 miles n.n.e. of Bordeaux, on the summit of a rocky hill. There are manufactures of paper, woollens, linens, distilleries, sugar-works, tanneries, etc. Pop. 34,647.

**AN'HALT**, a duchy of North Germany, lying partly in the plains of the Middle Elbe, and partly in the valleys and uplands of the Lower Harz, and almost entirely surrounded by Prussia; area, 906 sq. miles; pop. 316,027, almost all Protestants. The chief towns are Dessau, Bernburg, Köthen, and Zerbst.

**ANILINE**, a substance which has recently become of great importance, as being the basis of a number of brilliant and durable dyes. It is found in small quantities in coal tar, but the aniline of commerce is obtained from benzene or benzole, a constituent of coal-tar, consisting of hydrogen and carbon. Benzene, when acted on by nitric acid, produces nitrobenzene; and this substance again, when treated with nascent hydrogen, generally produced by the action of acetic acid upon iron-filings or scraps, produces aniline. It is a colorless oily liquid, somewhat heavier than water, with a peculiar vinous smell, and a burning taste. When acted on by arsenious acid, bichromate of potassium, stannic chloride, etc., aniline produces a great variety of compounds, many of which are possessed of very beautiful colors, and are known by the names of aniline purple, aniline green, roseine, violine, bleu de Paris, magenta, etc.

**AN'ILISM**, aniline poisoning, a name given to the aggregate of symptoms which often show themselves in those employed in aniline works, resulting from the inhalation of aniline vapors. It may be either acute or chronic. In a slight attack of the former kind, the lips, cheeks, and ears become of a bluish color, and the person's walk may be unsteady; in severe cases there is loss of consciousness. Chronic anilism is accompanied by derangement of the digestive organs and of the nervous



system, headaches, eruptions on the skin, muscular weakness, etc.

**ANIMAL**, an organized and sentient living being. Life in the earlier periods of natural history was attributed almost exclusively to animals. With the progress of science, however, it was extended to plants. In the case of the higher animals and plants there is no difficulty in assigning the individual to one of the two great kingdoms of organic nature, but in their lowest manifestations the vegetable and animal kingdoms are brought into such immediate contact that it becomes almost impossible to assign them precise limits and to say with certainty where the one begins and the other ends. From form no absolute distinction can be fixed between animals and plants. Many animals, such as the sea-shrubs, sea-mats, etc., so resemble plants in external appearance that they were, and even yet popularly are, looked upon as such. With regard to internal structure no line of demarkation can be laid down, all plants and animals being, in this respect, fundamentally similar; that is, alike composed of molecular, cellular, and fibrous tissues. Neither are the chemical characters of animal and vegetable substances more distinct. Animals contain in their tissues and fluids a larger proportion of nitrogen than plants, while plants are richer in carbonaceous compounds than the former. In some animals, moreover, substances almost exclusively confined to plants are found. Thus the outer wall of Sea-squirts contains cellulose, a substance largely found in plant-tissues; while chlorophyll, the coloring-matter of plants, occurs in *Hydria* and many other lower animals. Power of motion, again, though broadly distinctive of animals, cannot be said to be absolutely characteristic of them. Thus many animals, as oysters, sponges, corals, etc., in their mature condition are rooted or fixed, while the embryos of many plants, together with numerous fully developed forms, are endowed with locomotive power by means of vibratile, hair-like processes called cilia. The distinctive points between animals and plants which are most to be relied on are those derived from the nature and mode of assimilation of the food. Plants feed on inorganic matters, consisting of water, ammonia, carbonic acid, and mineral matters. They can only take in food which is presented to them in a liquid or gaseous state. The exceptions to these rules are found chiefly in the case of plants which live parasitically on other plants or on animals, in which cases the plant may be said to feed on organic matters, represented by the juices of their hosts. Animals, on the contrary, require organized matters for food. They feed either upon plants or upon other animals. But even carnivorous animals can be shown to be dependent upon plants for subsistence; since the animals upon which *Carnivora* prey are in their turn supported by plants. Animals, further, can subsist on solid food in addition to liquids and gases; but many animals (such as the Tapeworms) live by the mere imbibition of fluids which are

absorbed by their tissues, such forms possessing no distinct digestive system. Animals require a due supply of oxygen gas for their sustenance, this gas being used in respiration. Plants, on the contrary, require carbonic acid. The animal exhales or gives out carbonic acid as the part result of its tissue-waste, while the plant taking in this gas is enabled to decompose it into its constituent carbon and oxygen. The plant retains the former for the uses of its economy, and liberates the oxygen, which is thus restored to the atmosphere for the use of the animal. Animals receive their food into the interior of their bodies, and assimilation takes place in their internal surfaces. Plants, on the other hand, receive their food into their external surfaces, and assimilation is effected in the external parts as are exemplified in the leaf-surfaces under the influence of sunlight. All animals possess a certain amount of heat or temperature which is necessary for the performance of vital action. The only classes of animals in which a constantly-elevated temperature is kept up are birds and mammals. The bodily heat of the former varies from 100° F. to 112° F., and of the latter from 96° F. to 104° F. The mean or average heat of the human body is about 99° F., and it never falls much below this in health. Below birds animals are named "cold-blooded," this term meaning in its strictly physiological sense that their temperature is usually that of the medium in which they live, and that it varies with that of the surrounding medium. "Warm-blooded" animals, on the contrary, do not exhibit such variations, but mostly retain their normal temperature in any atmosphere. The cause of the evolution of heat in the animal body is referred to the union (by a process resembling ordinary combustion) of the carbon and hydrogen of the system with the oxygen taken in from the air in the process of respiration.

**ANIMAL CHEMISTRY**, the department of organic chemistry which investigates the composition of the fluids and the solids of animals, and the chemical action that takes place in animal bodies. There are four elements, sometimes distinctively named organic elements, which are invariably found in living bodies, viz., carbon, hydrogen, oxygen, and nitrogen. To these may be added, as frequent constituents of the human body, sulphur, phosphorus, lime, sodium, potassium, chlorine, and iron. The four organic elements are found in all the fluids and solids of the body. Sulphur occurs in blood and in many of the secretions. Phosphorus is also common, being found in nerves, in the teeth, and in fluids. Chlorine occurs almost universally throughout the body; lime is found in bone, in the teeth, and in the secretions; iron occurs in the blood, in urine, and in bile; and sodium, like chlorine, is of almost universal occurrence. Potassium occurs in muscles, in nerves, and in the blood-corpuscles. Minute quantities of copper, silicon, manganese, lead, and lithium are also found in the human body. The compounds formed in the

human organism are divisible into the organic and inorganic. The most frequent of the latter is water, of which two-thirds (by weight) of the body are composed. The organic compounds may, like the foods from which they are formed, be divided into the nitrogenous and non-nitrogenous. Of the former the chief are albumen (found in blood, lymph, and chyle), casein (found in milk), myosin (in muscle), gelatin (obtained from bone), and others. The non-nitrogenous compounds are represented by organic acids, such as formic, acetic, butyric, stearic, etc.; by animal starches, sugar; and by fats and oils, as stearin and olein.

**ANIMALCULE** (an-i-mal'kūl), a general name given to many forms of animal life from their minute size.

**ANIMAL HEAT**. See *Animal*.

**ANIMAL MAGNETISM**. See *Mesmerism*.

**ANIMALS**, Cruelty to. See *Cruelty*.

**ANIMAL WORSHIP**, a practice found to prevail, or to have prevailed, in the most widely distant parts of the world, both the Old and the New, but nowhere to such an amazing extent as in ancient Egypt, notwithstanding its high civilization. Nearly all the more important animals found in the country were regarded as sacred in some part of Egypt, and the degree of reverence paid to them was such that throughout Egypt the killing of a hawk or an ibis, whether voluntary or not, was punished with death. The worship, however, was not, except in a few instances, paid to them as actual deities. The animals were merely regarded as sacred to the deities, and the worship paid to them was symbolical.

**ANISE** (an'is), an annual plant, a native of the Levant, and cultivated in Spain, France, Italy, Malta, etc., whence the fruit, popularly called aniseed, is imported. This fruit is ovate, with ten narrow ribs, between which are oil-vessels. It has an aromatic smell, and is largely employed to flavor liquors (aniseed or anisette), sweetmeats, etc.

**ANISEED**. See *Anise*.

**ANJOU** (ān-zhō), an ancient province of France, now forming the department of Maine-et-Loire, and parts of the departments of Indre-et-Loire, Mayenne, and Sarthe; area, about 3000 sq. miles.

**ANKLE**. See *Foot*.

**ANKYLO'SIS**, or **ANCHYLO'SIS**, stiffness of the joints caused by a more or less complete coalescence of the bones through ossification, often the result of inflammation or injury. False ankylosis is stiffness of a joint when the disease is not in the joint itself, but in the tendinous and muscular parts by which it is surrounded.

**ANNA COMNENA**, daughter of Alexius Comnenus I., Byzantine emperor. She was born 1083, and died 1148. After her father's death she endeavored to secure the succession to her husband, Nicephorus Briennius, but was baffled by his want of energy and ambition. She wrote (in Greek) a life of her father Alexius, which, in the midst of much fulsome panegyric, contains some valuable and interesting information. She



forms a character in Sir Walter Scott's Count Robert of Paris.

**ANNA IVANOVNA**, Empress of Russia; born in 1693, the daughter of Ivan, the elder half-brother of Peter the Great. She was married in 1710 to the Duke of Courland, in the following year was left a widow, and in 1730 ascended the throne of the czars on the condition proposed by the senate, that she would limit the absolute power of the czars, and do nothing without the advice of the council composed of the leading members of the Russian aristocracy. But no sooner had she ascended the throne than she declared her promise null, and proclaimed herself autocrat of all the Russias. She chose as her favorite Ernest John von Biren or Biron, who was soon all-powerful in Russia, and ruled with great severity. Several of the leading nobles were executed, and many thousand men exiled to Siberia. In 1737 Anna forced the Courlanders to choose Biren as their duke, and nominated him at her death regent of the empire during the minority of Prince Ivan (of Brunswick). Anna died in 1740.

**ANNALS**, a history of events in chronological order, each event being recorded under the year in which it occurred.

**ANNAM'**. See Anam.

**ANNAPOLIS**, the capital of Maryland, on the Severn, near its mouth in Chesapeake Bay. It contains a college



State Capitol, Annapolis, Md.

(St. John's), a statehouse, and the United States naval academy. Pop. 9000.

**ANN ARBOR**, a town in Michigan, on the Huron river, about 40 miles west of Detroit; the seat of the state university, has flour-mills, and manufactures of woolens, iron, and agricultural implements. Pop. 16,000.

**ANNE**, Queen of Great Britain and Ireland, was born at Twickenham, near London, 6th February, 1664. She was the second daughter of James II., then Duke of York, and Anne, his wife, daughter of the Earl of Clarendon. After the death of William III. in 1702 she ascended the English throne. Her character was essentially weak, and she was governed first by Marlborough and his wife, and afterward by Mrs. Mas-

ham. Most of the principal events of her reign are connected with the war of the Spanish Succession. The only important acquisition that England made by it was Gibraltar, which was captured in 1704. Another very important event



Queen Anne.

of this reign was the union of England and Scotland under the name of Great Britain, which was accomplished in 1707. She seems to have long cherished the wish of securing the succession to her brother James, but this was frustrated by the internal dissensions of the cabinet. Grieved at the disappointment of her secret wishes, she fell into a state of weakness and lethargy, and died, July 20, 1714. The reign of Anne was distinguished not only by the brilliant successes of the British arms, but also on account of the number of admirable and excellent writers who flourished at this time, among whom were Pope, Swift, and Addison.

**ANNE** (of Austria), daughter of Philip III. of Spain, was born at Madrid in 1602, and in 1615 was married to Louis XIII. of France. Richelieu, fearing the influence of her foreign connections, did everything he could to humble her. In 1643 her husband died, and she was left regent, but placed under the control of a council. But the parliament overthrew this arrangement, and intrusted her with full sovereign rights during the minority of her son Louis XIV. She, however, brought upon herself the hatred of the nobles by her boundless confidence in Cardinal Mazarin, and was forced to flee from Paris during the wars of the Fronde. She ultimately quelled all opposition, and was able in 1661 to transmit to her son unimpaired the royal authority. She spent the remainder of her life in retirement, and died January 20, 1666.

**ANNEALING** (an-ē'ling), a process to which many articles of metal and glass are subjected after making, in order to render them more tenacious, and which consists in heating them and allowing them to cool slowly. When the metals are worked by the hammer, or rolled into plates, or drawn into wire, they acquire a certain amount of brittleness, which destroys their usefulness, and has to be remedied by annealing. The tempering of steel is one kind of annealing. Annealing is particularly employed in glass-houses, and consists in putting the glass vessels, as soon as they are formed and while they are yet hot, into a furnace or oven, in which they are suffered

to cool gradually. The toughness is greatly increased by cooling the articles in oil.

**ANNEXA'TION**, the act of a state in acquiring territory, near or remote, whether independent or belonging to another power. It has been recently decided by the Supreme Court of the United States, in the so-called insular cases (1901), that Porto Rico remained foreign territory, notwithstanding the destruction of the Spanish sovereignty and government and the occupation of the island by the military forces of the United States until the ratification of the treaty of peace with Spain in 1898, and that it was this act which extended the sovereignty of the United States over that island. Where the transfer of title is not acquiesced in by the former sovereign, there must be an effective occupation and a virtually complete destruction of the previously existing authority. But the annexation may be complete notwithstanding the active or passive opposition of the inhabitants of the territory affected.

**ANNUAL**, in botany, a plant that springs from seed, grows up, produces seed, and then dies, all within a single year or season.

**ANNUAL**, in literature, the name given to a class of publications which at one time enjoyed an immense yearly circulation, and were distinguished by great magnificence both of binding and illustration, which rendered them much sought after as Christmas and New Year presents. Their contents were chiefly prose tales and ballads, lyrics, and other poetry.

**ANNUITY**, a sum of money paid annually to a person, and continuing either a certain number of years, or for an uncertain period, to be determined by a particular event, as the death of the recipient or annuitant, or that of the party liable to pay the annuity; or the annuity may be perpetual. The payments are made at the end of each year, or semi-annually, or at other periods. An annuity is usually raised by the present payment of a certain sum as a consideration whereby the party making the payment, or some other person named by him, becomes entitled to an annuity, and the rules and principles by which this present value is to be computed have been the subjects of careful investigation. The present value of a perpetual annuity is evidently a sum of money that will yield an interest equal to the annuity, and payable at the same periods; and an annuity of this description, payable quarterly, will evidently be of greater value than one of the same amount payable annually, since the annuitant has the additional advantage of the interest on three of the quarterly payments until the expiration of the year. In other words, it requires a greater present capital to be put at interest to yield a given sum per annum, payable quarterly, than to yield the same annual sum payable at the end of each year. The present value of an annuity for a limited period is a sum which, if put at interest, will at the end of that period give an amount equal to the sum of all the payments of the annuity and inter-



est; and, accordingly, if it be proposed to invest a certain sum of money in the purchase of an annuity for a given number of years the comparative value of the two may be precisely estimated, the rate of interest being given.

**ANNUNCIATION**, the declaration of the angel Gabriel to the Virgin Mary informing her that she was to become the mother of our Lord.—Annunciation or Lady Day is a feast of the R. C. church in honor of the annunciation, celebrated on the 25th of March.—There are two orders of nuns of the Annunciation, one originally French, founded in 1501 by Joanna of Valois, the other Italian, founded in 1604 by Maria Vittoria Fornari of Genoa.

**AN'ODE**, the positive pole of the voltaic current, being that part of the surface of a decomposing body which the electric current enters: opposed to cathode, the way by which it departs.

**AN'ODYNE**, a medicine, such as an opiate or narcotic, which allays pain.

**ANOINTING**, rubbing the body or some part of it with oil, often perfumed. From time immemorial the nations of the East have been in the habit of anointing themselves for the sake of health and beauty. The Greeks and Romans anointed themselves after the bath. Wrestlers anointed themselves in order to render it more difficult for their antagonists to get hold of them. In Egypt it seems to have been common to anoint the head of guests when they entered the house where they were to be entertained, as shown in the cut. In the Mosaic law a sacred character was attached to the anointing of the garments of the priests and things belonging to the ceremonial of worship. The Jewish priests and kings were anointed when inducted into office, and were called the anointed of the Lord, to show that their persons were sacred and their office from God. In the Old Testament



Egyptian anointing a guest.

also the prophecies respecting the Redeemer style him Messiah, that is, the Anointed, which is also the meaning of his Greek name Christ. The custom of anointing still exists in the Roman Catholic Church in the ordination of priests and the confirmation of believers and the sacrament of extreme unction. The ceremony is also frequently a part of the coronation of kings.

**ANOM'ALY**, in astronomy, the angle which a line drawn from a planet to the sun has passed through since the planet

was last at its perihelion or nearest distance to the sun. The anomalistic year is the interval between two successive times at which the earth is in perihelion, or 365 days 6 hours 13 minutes 45 seconds. In consequence of the advance of the earth's perihelion among the stars in the same direction as the earth's motion and of the precession of

which the males perish, and the few females which escape the pursuit of their numerous enemies divest themselves of their wings, and either return to established nests, or become the foundresses of new colonies. The neuters perform all the labors of the ant-hill or abode of the community; they excavate the galleries, procure



Antananarivo.

the equinoxes, which carries the equinoxes back in the opposite direction to the earth's motion, the anomalistic year is longer than the sidereal year, and still longer than the tropical or common year.

**ANON'YMOUS**, literally, "without name," applied to anything which is the work of a person whose name is unknown or who keeps his name secret. Pseudonym is a term used for an assumed name. The knowledge of the anonymous and pseudonymous literature is indispensable to the bibliographer, and large dictionaries given the titles and writers of such works have been published.

**ANSO'NIA**, a city in New Haven Co., Conn., 12 miles west by north of New Haven, on the Naugatuck river, and on the Berkshire and Naugatuck divisions of the New York, New Haven and Hartford Railroad. Ansonia is noted as a manufacturing center, the products including heavy machinery, rollers for paper-making and wheat-milling, copper, brass, and wire goods, electrical appliances, clocks, etc. Pop. 14,000.

**ANSPACH** (an'spág). See Ansbach.

**ANT**, the common name of insects of various genera found in most temperate and tropical regions. They are small but powerful insects, and have long been noted for their remarkable intelligence and interesting habits. They live in communities regulated by definite laws, each member of the society bearing a well-defined and separate part in the work of the colony. Each community consists of males; of females much larger than the males; and of barren females, otherwise called neuters, workers, or nurses. The neuters are wingless, and the males and females only acquire wings for their "nuptial flight," after

food, and feed the larvæ or young ants, which are destitute of organs of motion. In fine weather they carefully convey them to the surface for the benefit of the sun's heat, and as attentively carry them to a place of safety either when bad weather is threatened or the ant-hill is disturbed. In like manner they watch over the safety of the nymphs or pupæ about to acquire their perfect growth. Some communities possess a special type of neuters, known as "soldiers," from the duties that specially fall upon them, and from their powerful biting jaws. There is a very considerable variety in the materials, size, and form of ant-hills, or nests, according to the peculiar nature or instinct of the species.

**ANTAL'KALI**, a substance which neutralizes an alkali, and is used medicinally to counteract an alkaline tendency in the system. All true acids have this power.

**ANTANANARIVO** (an-tan-an-a-ré'vô), the capital of Madagascar, situated in the central province of Imérina. Antananarivo is the residence of the French governor of Madagascar, and there is a strong French garrison. It has manufactures of metal work, cutlery, silk, etc. Pop. about 100,000.

**ANTARCTIC** (ant-ärk'tik), relating to the southern pole or to the region near it. The Antarctic Circle is a circle parallel to the equator and distant from the south pole 23° 28', marking the area within which the sun does not set when on the tropic of Capricorn. The Antarctic Circle has been arbitrarily fixed on as the limits of the Antarctic Ocean, it being the average limit of the pack-ice; but the name is often extended to embrace a much wider area. The lands in or near the Antarctic



Circle are but imperfectly known, the work of exploration having been hitherto baffled by what seems an insurmountable ice-barrier. Sir James Ross in 1841-42, discovered Victoria Land (extending to about 79° s. lat.), with its volcanoes Erebus (12,400 ft.) and Terror (10,900 ft.). The South Shetland Islands, Enderby Land, Graham's Land, etc., have also been discovered in this ocean. Capt. Scott in 1902 reached 82° 17' which is 532 miles from the pole.

**ANT-EATER**, a name given to mammals of various genera that prey chiefly on ants. The head is remarkably elongated, the jaws destitute of teeth; and the mouth furnished with a long, extensile tongue covered with glutinous saliva, by the aid of which the animals secure their insect prey. The eyes are particularly small, the ears short and round, and the legs, especially the anterior, very robust, and furnished with long, compressed, acute nails, admirably adapted for breaking into the ant-hills. The most remarkable species is the ant-bear, a native of the warmer parts of South America. It is from 4 to 5 feet in length from the tip of the muzzle to the origin of the black bushy tail, which is about two feet long. The body is covered with long hair, particularly along the neck and back. It is a harm-



Ant-bear.

less and solitary animal, and spends most of its time in sleep. Some are adapted for climbing trees in quest of the insects on which they feed, having prehensile tails. All are natives of South America.

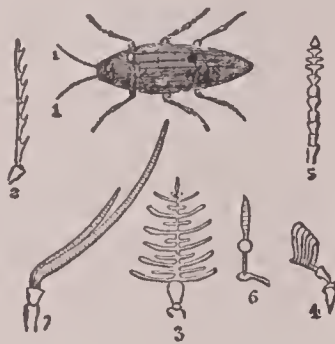
**ANTECEDENT**, in grammar, the noun to which a relative or other pronoun refers; as, Solomon was the prince who built the temple, where the word prince is the antecedent of who.—In logic, that member of a hypothetical or conditional proposition which contains the condition, and which is introduced by if or some equivalent word or words; as, if the sun is fixed, the earth must move. Here the first and conditional proposition is the antecedent, the second the consequent.

**ANTEDILUVIAN**, before the flood or deluge of Noah's time; relating to what happened before the deluge. In geology the term has been applied to organisms, traces of which are found in a fossil state in formations preceding the Diluvial, particularly to extinct animals such as the paleotherium, the mastodon, etc.

**ANTELOPE**, the name given to the members of a large family of Ruminant Ungulata or Hoofed Mammalia, closely resembling the Deer in general appearance, but essentially different in nature from the latter animals. They are included with the Sheep and Oxen in the

family of the Cavicornia or "Hollow-horned" Ruminants. Their horns, unlike those of the Deer, are not deciduous, but are permanent; are never branched, but are often twisted spirally, and may be borne by both sexes. They are found in greatest number and variety in Africa. Well-known species are the chamois (European), the gazelle, the addax, the eland, the koodoo, the gnu, the springbok, the sasin or Indian antelope, and the prongbuck of America.

**ANTEN'NÆ**, the name given to the movable jointed organs of touch and hearing attached to the heads of insects,



Antennæ.

1, 1, Filiform Antennæ of Cucujo Firefly of Brazil. 2, Denticulate Antenna; 3, Bipinnate; 4, Lamellicorn; 5, Clavate; 6, Geniculate; 7, Antenna and Antennule of Crustacean.

myriapods, etc., and commonly called horns or feelers. They present a very great variety of forms.

**ANTHEM**, originally a hymn sung in alternate parts; in modern usage, a sacred tune or piece of music set to words taken from the Psalms or other parts of the Scriptures, first introduced into church service in Elizabeth's reign; a developed motet. The anthem may be for one, two, or any number of voices, but seldom exceeds five parts, and may or may not have an organ accompaniment written for it.

**ANTHEMION**, an ornament or ornamental series used in Greek and Roman decoration, which is derived from floral forms, more especially the honeysuckle.



Anthemion.

It was much used for the ornamentation of friezes and interiors, for the decoration of fictile vases, the borders of dresses, etc.

**ANTHOL'OGY**, the name given to several collections of short poems which have come down from antiquity.

**ANTHONY**, St., the founder of monastic institutions; born near Heraclea, in Upper Egypt, A.D. 251. Giving up all his property, he retired to the desert, where he was followed by a number of disciples, who thus formed the first community of monks. He died at the age of 105.—St. Anthony's Fire, a name given to erysipelas.

**ANTHONY**, Susan B., the founder of the woman suffrage movement in the United States. She was born in Massachusetts in 1820, partook in the abolitionist movement, and in 1868 founded *The Revolution*, a journal advocating woman's rights. She voted at the election of 1872 and was arrested and fined. She wrote several tracts and books, principally on woman's rights.

**ANTHRACITE**, glance or blind coal, a non-bituminous coal of a shining luster, approaching to metallic, and which burns without smoke, with a weak or no flame, and with intense heat. It consists of, on an average, 90 per cent carbon, 3 hydrogen, and 5 ashes. It has some of the properties of coke or charcoal, and, like that substance, represents an extreme metamorphism of coal under the influence of heat or of volcanic disturbance. It is found in England, Scotland, and Ireland, and in large quantities in the United States, chiefly in Pennsylvania.

**ANTHRAX**, a fatal disease to which cattle, horses, sheep, and other animals are subject, always associated with the presence of an extremely minute micro-organism in the blood. It frequently assumes an epizootic form, and extends over large districts, affecting all classes of animals which are exposed to the exciting causes. It is also called splenic fever, and is communicable to man, appearing as carbuncle, malignant pustule, or wool-sorter's disease.

**ANTHROPOL'OGY**, the science of man and mankind, including the study of man's place in nature, that is, of the measure of his agreement with and divergence from other animals; of his physical structure and psychological nature, together with the extent to which these act and react on each other; and of the various tribes of men, determining how these may have been produced or modified by external conditions, and consequently taking account also of the advance or retrogression of the human race. It puts under contribution all sciences which have man for their object, as archæology, comparative anatomy, physiology, psychology, climatology, etc. See *Ethnology*.

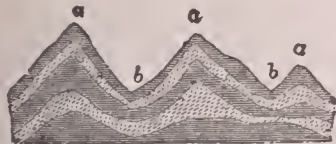
**ANTHROPOMORPHISM**, the representation or conception of the Deity under a human form, or with human attributes and affections. Anthropomorphism is founded in the natural inaptitude of the human mind for conceiving spiritual things except through sensuous images, and in its consequent tendency to accept such expressions as those of Scripture when it speaks of the eye, the ear, and the hand of God, of his seeing and hearing, of his remembering and forgetting, of his making man in his own image, etc., in a too literal sense.

**ANTHROPOPH'AGI**, the name given to those individuals or tribes by whom human flesh is eaten: man-eaters, cannibals. The Caribs are said to have been cannibals at the time of the Spanish conquest of America, and the word "cannibal" is derived from their name.

**ANTICHRIST**, a word occurring in the first and second epistles of St. John, and nowhere else in Scripture, in passages having an evident reference to a



personage real or symbolical mentioned or alluded to in various other passages both of the Old and New Testaments. In every age the church has held through all its sects some definite expectation of a formidable adversary of truth and righteousness prefigured under this name. Thus Roman Catholics have found Antichrist in heresy, and Protestants in Romanism. In one point the



a, a, a, Anticlinal line. b, b, Synclinal line.

sects have generally been agreed, namely in regarding the various intimations on this subject in the Old and New Testaments as a homogeneous declaration or warning, inspired by the spirit of prophecy, of danger to the true religion from some disaffection and revolt organized in the latter days by Satan. Most modern critics take a different view of the matter. They do not regard the various Scriptural writers who have dealt with this subject as having had any common inspiration or design. They believe that each writer from his own point of view, guided by mere human sagacity, gives expression in his predictions to his own individual apprehensions, or narrates as prediction what he already knows. It is the near political horizon which suggests the danger, or contemporary history the substance of the prophecy; thus the Antichrist of Daniel is Antiochus Epiphanes, that of St. John Nero, that of St. Paul some adversary of Christianity about to appear in the time of the Emperor Claudius.

**ANTICLINAL LINE OR AXIS**, in geology, the ridge of a wave-like curve made by a series of superimposed strata, the strata dipping from it on either side as from the ridge of a house: a synclinal line runs along the trough of such a wave.

**ANTICOS'TI**, an island of Canada, in the mouth of the St. Lawrence, 125 miles long by 30 miles broad. The interior is mountainous and wooded, but there is much good land, and it is well adapted for agriculture. The fisheries are valuable. The population is scanty, however.

**AN'TIDOTE**, a medicine to counteract the effects of poison.

**ANTIETAM** (an-tē'tam), a small stream in the United States which falls into the Potomac about 50 miles n.w. of Washington; scene of an indecisive battle between the Federal and Confederate armies, 17th Sept., 1862.

**AN'TI-FED'ERALISTS**, a certain political party in the United States. The Federalists believed in a national system of government, while the Anti-Federalists believed in a decentralized and strictly federal system of government. The Federalists had the advantages of possessing a positive program and of gaining the first two points in the conflict when the national constitution was adopted and when they committed the national government to the exercise of such extensive powers as

the creation of a national bank. The Anti-Federalists were thus merely a party of political opposition to the party in power. When, however, the Federalists, in the Alien and Sedition Acts, seemed to encroach both upon the liberty of the individual and upon the jurisdiction of the States, the opposition of the Anti-Federalists became acute and their fundamental propositions were stated in the Virginia and Kentucky Resolutions. This crisis resulted in the triumph of the Anti-Federalists under the leadership of Jefferson in the election of 1800; but soon thereafter the leaders of the party began to abandon its original creed of the strict interpretation of the constitution and the narrow limitation of the powers of the national government. The first step in this direction was the purchase of Louisiana; and when finally the Federalists party was driven entirely out of existence, its characteristic principles remained effective as the chief principle of the Anti-Federalist party.

**ANTIFRICTION METAL**, a name given to various alloys of tin, zinc, copper, antimony, lead, etc., which oppose little resistance to motion, with great resistance to the effects of friction, so far as concerns the wearing away of the surfaces of contact.

**ANTIGONE** (an-tig'o-nē), in Greek mythology, the daughter of Œdipus and Jocasta, celebrated for her devotion to her father and to her brother Polynices, for burying whom against the decree of King Creon she suffered death.

**ANTIGUA** (an-te'ga), one of the British West Indies, the most important of the Leeward group; 28 miles long, 20 broad; area, 108 square miles. Discovered by Columbus, 1493. Its shores are

open cotton or worsted work, to preserve them from being soiled, as by the oil applied to the hair.

**ANTI-MONOPOLY PARTY**, a political party organized at Chicago May 14, 1884, with Benjamin F. Butler as its candidate for president. Its demands were an interstate commerce law, an income tax, free trade, and legalized labor unionism. It was afterward merged with the Greenback and Populist parties.

**AN'TIMONY**, a brittle metal of a bluish-white or silver-white color and a crystalline or laminated structure. It melts at 842° F., and burns with a bluish-white flame. The mineral called stibnite, or antimony-glance, is a trisulphide, and is the chief ore from which the metal is obtained. It is found in many places, including France, Spain, Hungary, Italy, Canada, Australia, and Borneo. The metal, or, as it was formerly called, the regulus of antimony, does not rust or tarnish when exposed to the air. When alloyed with other metals it hardens them, and is therefore used in the manufacture of alloys, such as Britannia-metal, type-metal, and pewter. In bells it renders the sound more clear; it renders tin more white and sonorous as well as harder, and gives to printing types more firmness and smoothness. The salts of antimony are very poisonous. The protoxide is the active base of tartar emetic and James's powder, and is justly regarded as a most valuable remedy in many diseases.—Yellow antimony is a preparation of antimony of a deep yellow color, used in enamel and porcelain painting. It is of various tints, and the brilliancy of the brighter hues is not affected by foul air.

**ANTIN'OMY**, the opposition of one



St. John, Antigua.

high and rocky; the surface is varied and fertile. The capital, St. John, the residence of the governor of the Leeward Islands, stands on the shore of a well-sheltered harbor in the north-west part of the island. The staple articles of export are sugar, molasses, and rum. Pop. (including Barbuda), 56,175.

**ANTILLES** (an-til'ēz), another name for the West Indian Islands.

**ANTIMACASS'AR**, a covering for chairs, sofas, couches, etc., made of

law of rule to another law or rule; in the Kantian philosophy, that natural contradiction which results from the law of reason, when, passing the limits of experience, we seek to conceive the complex of external phenomena, or nature, as a world or cosmos.

**ANTIOCH** (an'ti-ok), a famous city of ancient times, the capital of the Greek kings of Syria, on the left bank of the Orontes, about 21 miles from the sea, in a beautiful and fertile plain;



founded by Seleucus Nicator in 300 B.C., and named after his father Antiochus. In Roman times it was the seat of the Syrian governors, and the center of a widely-extended commerce. It was called the "Queen of the East" and "The Beautiful." Antioch is frequently mentioned in the New Testament, and it was here that the disciples of our Savior were first called Christians (Acts xi. 26). There was another Antioch, in Pisidia, at which Paul preached on his first missionary journey.

**ANTIOCHUS** (an-ti'o-kus), a name of several Græco-Syrian kings of the dynasty of the Seleucidæ. **ANTIOCHUS I.**, called ("savior"), was son of Seleucus, general of Alexander the Great, and founder of the dynasty. He was born about B.C. 324. During the greater part of his reign he was engaged in a protracted struggle with the Gauls who had crossed from Europe, and by whom he was killed in battle B.C. 261.—**ANTIOCHUS II.**, surnamed Theos (god), succeeded his father, was murdered in

was assigned to Antipater, who succeeded in establishing the Macedonian rule in Greece on a firm footing. He died in B.C. 317 at an advanced age.

**ANTIP'ATHY**, a special dislike exhibited by individuals to particular objects or persons, usually resulting from physical or nervous organization. An antipathy is often an unaccountable repugnance to what people in general regard with no particular dislike, as certain sounds, smells, articles of food, etc., and it may be manifested by fainting or extreme discomfort.

**ANTIPODES** (an-tip'o-dēz), the name given relatively to people or places on opposite sides of the earth, so situated that a line drawn from one to the other passes through the center of the earth and forms a true diameter. The longitudes of two such places differ by 180°. The difference in their time is about twelve hours, and their seasons are reversed.

**ANTIPOPE**, the name applied to those who at different periods have pro-

and the like, and more especially to the works of Grecian and Roman antiquity.

**ANTI-RENTISM**, a movement organized to uproot a kind of feudalism existing in certain counties in New York. It lasted from 1839 to 1847, during which time there were many evictions. The system of feudal tenures was broken up in 1846 by the insertion in the new constitution of New York of a clause abolishing all feudal tenures and limiting agricultural leases to twelve years.

**ANTIRRHINUM** (an-ti-rī'nūm), a genus of annual or perennial plants, commonly known as snapdragon, on account of the peculiarity of the blossoms, which, by pressing between the finger and thumb, may be made to open and shut like a mouth. They all produce showy flowers, and are much cultivated in gardens.

**ANTI-SEMITISM**, a term describing a movement in Russia, France, Austria, Germany, and other countries in Europe, by which it is sought to limit the influence of the Jews and otherwise harass them. In Germany the leaders of the movement have been among the most eminent of German scholars.

Since its organization in Germany the Anti-Semitic Party has been organized in Russia, Austria, Greece, and Holland. As the Jews in Russia are to a great extent kept out of the ordinary trades, many of them have resorted to the business of money lending, and by means of mortgages placed to secure loans they have obtained control of small landed properties. This fact, coupled with religious prejudice, caused the Anti-Semitic movement in Russia, about twenty years ago, to assume a most violent form. Laws preventing them from entering professions and from living in places other than towns and hamlets were vigorously enforced. In some cities, where a majority of the people were Jews, they were expelled without warning. The fierce persecution to which the Jews have been subjected in Russia and Roumania has caused an emigration on a vast scale to the United States.

**ANTISEPTIC**, an agent by which the putrefaction of vegetable or animal matters is prevented or arrested. There are a great number of substances having this preservative property, among which are salt, alcohol, vegetable charcoal, creosote, corrosive sublimate, tannic acid, sulphurous acid, sulphuric ether, chloroform, arsenic, wood-spirit, aloes, camphor, benzine, aniline, etc. The packing of fish in ice, and the curing of herring and other fish with salt, are familiar antiseptic processes. The different antiseptics act in different ways. The term is applied in a specific manner to that mode of treatment in surgery by which air is excluded from wounds, or allowed access only through substances capable of destroying the germs in the atmosphere, on whose presence suppuration is assumed to depend.

**ANTISPASMODIC**, a medicine proper for the cure of spasms and convulsions; such belong largely to the class of ethers, as sulphuric ether, chloric ether, nitric ether, etc.



Medal of Antiochus Epiphanes.



B.C. 246 by Laodicē, his wife, whom he had put away to marry Berenicē, daughter of Ptolemy.—**ANTIOCHUS III.**, surnamed the Great, grandson of the preceding, was born B.C. 242, succeeded in B.C. 223. Antiochus gained an important adviser in Hannibal, who had fled for refuge to his court; but he lost the opportunity of an invasion of Italy while the Romans were engaged in war with the Gauls, of which the Carthaginian urged him to avail himself. The Romans defeated him by sea and land, and he was finally overthrown by Scipio at Mount Sipylus, in Asia Minor, B.C. 190. He was killed while plundering a temple in Elymais to procure money to pay the Romans.—**ANTIOCHUS IV.**, called Epiphanes, youngest son of the above, is chiefly remarkable for his attempt to extirpate the Jewish religion, and to establish in its place the polytheism of the Greeks. This led to the insurrection of the Maccabees, by which the Jews ultimately recovered their independence. He died B.C. 164.

**ANTIOQUIA** (an-tē-ō-kē'ā), a town of S. America, in Colombia, on the river Cauca; founded in 1542. Pop. 10,000. It gives name to a department of the republic; area, 22,316 sq. miles; pop. 464,887. Capital, Medellín.

**ANTIP'ATER**, a general and friend of Philip of Macedon, father of Alexander the Great. On the death of Alexander, in 323 B.C., the regency of Macedonia

duced a schism in the Roman Catholic Church by opposing the authority of the pope, under the pretense that they were themselves popes. The Roman Church cannot admit that there ever existed two popes; but the fact is, that in several cases both competitors for the papal chair (sometimes there were three or even four) were equally popes; that is to say, the claims of all were equally good. Each was frequently supported by whole nations, and the schism was nothing but the struggle of political interests.

**ANTIPY'RIN**, a drug obtained from coal-tar products, valuable in reducing fever and in relieving pain, being much used in nervous headache and neuralgia.

**AN'TIQUARIES**, those devoted to the study of ancient times through their relics, as old places of sepulcher, remains of ancient habitations, early monuments, implements or weapons, statues, coins, medals, paintings, inscriptions, books, and manuscripts, with the view of arriving at a knowledge of the relations, modes of living, habits, and general condition of the people who created or employed them. Societies or associations of antiquaries have been formed in all countries of European civilization.

**ANTIQUES** (an-tēks'), a term specifically applied to the remains of ancient art, as statues, paintings, vases, cameos,



**ANTISTHENES** (an-tis'the-nēz), a Greek philosopher and the founder of the school of Cynics, born at Athens about B.C. 444. He was first a disciple of Gorgias and then of Socrates, at whose death he was present. His philosophy was a one-sided development of the Socratic teaching. He held virtue to consist in complete self-denial and in



Marie Antoinette.

disregard of riches, honor, or pleasure of every kind. He himself lived as a beggar. He died in Athens at an advanced age.

**ANTITOX'IN**, a substance secreted in the blood of animals which counteracts the effects of the toxin, or toxins (poisonous substances), produced in the animal by the germs which find their way into the body and multiply there. Natural antitoxins make the body immune to germ diseases, but although it has been impossible as yet to manufacture these substances except in the animal body, this method has been found quite efficacious in the treatment of disease. The germs of diphtheria, for example, are injected into a mule or a horse. The animal becomes infected, but recovers. On its recovery a second injection is given, and so on until further injections have no effect. The animal is then "immune." Serum taken from the body of the immunized animal is then injected into a human patient suffering with the disease, and recovery quickly follows. This art is called serum therapy, and it is believed that almost all germ diseases will eventually be conquered by it.

**ANTITRINITARIANS**, all who do not receive the doctrine of the divine Trinity, or the existence of three persons in the Godhead; especially applied to those who oppose such a doctrine on philosophical grounds, as contrasted with Unitarians, who reject the doctrine as not warranted by Scripture.

**ANT-LION**, the larva of an insect which in its perfect state greatly resem-

bles a dragon-fly; curious on account of its ingenious method of catching the insects—chiefly ants—on which it feeds. It digs a funnel-shaped hole in the driest and finest sand it can find, and, when the pit is deep enough, and the sides are quite smooth and sloping, it buries itself at the bottom with only its formidable mandibles projecting, and waits till some luckless insect stumbles over the edge, when it is immediately seized, its juices sucked, and the dead body jerked from the hole.

**ANTOINETTE** (an-twā-net), Marie (Marie Antoinette Joseph Jeanne de Lorraine), Archduchess of Austria and Queen of France, the youngest daughter of the Emperor Francis I. and of Maria Theresa, was born at Vienna, 2d November, 1755; executed at Paris, 16th Oct. 1793. She was married at the age of fifteen to the Dauphin, afterward Louis XVI., but her manners were ill-suited to the French court, and she made many enemies among the highest families by her contempt for its ceremonies, which excited her ridicule. The freedom of her manners, indeed, even after she became queen, was a cause of scandal. The extraordinary affair of the diamond necklace, in which the Cardinal Louis de Rohan, the great quack Cagliostro, and a certain Countess de Lamotte were the chief actors, tarnished her name, and added force to the calumnies against her. Though it was proved in the examination which she demanded that she had never ordered the necklace, her enemies succeeded in casting a stigma on her, and the credulous people laid every public disaster to her charge. There is no doubt she had great influence over the king, and that she constantly opposed all measures of reform. The enthusiastic reception given her at the guards' ball at Versailles on 1st October, 1789, raised the general indignation to the highest pitch, and was followed in a few days by the insurrection of women, and the attack on Versailles. When practically prisoners in the Tuileries it was she who advised the flight of the royal family in June, 1791, which ended in their capture and return. On 10th August, 1792, she heard her husband's deposition pronounced by the Legislative Assembly, and accompanied him to the prison in the Temple, where she displayed the magnanimity of a heroine and the patient endurance of a martyr. In January, 1793, she parted with her husband, who had been condemned by the Convention; in August she was removed to the Conciergerie; and in October she was charged before the revolutionary tribunal with having dissipated the finances, exhausted the treasury, corresponded with the foreign enemies of France, and favored the domestic foes of the country. She defended herself with firmness, decision, and indignation; and heard the sentence of death pronounced with perfect calmness—a calmness which did not forsake her when the sentence was carried out the following morning. Her son, eight years of age, died shortly afterward, as was generally believed by poison, and her daughter was suffered to quit France, and afterward married her cousin the Duke of Angoulême.

**ANTONI'NUS**, Marcus Aurelius. See Aurelius.

**ANTONI'NUS PIUS**, Titus Aurelius Fulvus, Roman emperor, was born at Lavinium, near Rome, A.D. 86, died A.D. 161. In A.D. 120 he became consul, and he was one of the four persons of consular rank among whom Hadrian divided the supreme administration of Italy. He then went as proconsul to Asia, and after his return to Rome became more and more the object of Hadrian's confidence. In A.D. 138 he was selected by that emperor as his successor, and the same year he ascended the throne. The persecutions of the Christians he speedily abolished. He



Coin of Antoninus Pius.

carried on but a few wars. In Britain he extended the Roman dominion, and by raising a new wall put a stop to the invasions of the Picts and Scots. The senate gave him the surname Pius, that is, dutiful or showing filial affection, because to keep alive the memory of Hadrian he had built a temple in his honor. He was succeeded by Marcus Aurelius, his adopted son.

**ANTO'NIUS**, Marcus (Mark Antony), Roman triumvir, born 83 B.C., was connected with the family of Cæsar by his mother. Debauchery and prodigality marked his youth. To escape his creditors he went to Greece in 58, and from thence followed the consul Gabinius on a campaign in Syria as commander of the cavalry. He served in Gaul under Cæsar in 52 and 51. In 50 he returned to Rome to support the interests of Cæsar against the aristocratical party headed by Pompey, and was appointed tribune. When war broke out between Cæsar and Pompey, Antony led reinforcements to Cæsar in Greece, and in the battle of Pharsalia he commanded the left wing. He afterward returned to Rome with the appointment of master of the horse and governor of Italy (47). In B.C. 44 he became Cæsar's colleague in the consulship. Soon after Cæsar was assassinated, and Antony would have shared the same fate had not Brutus stood up in his behalf. Antony, by the reading of Cæsar's will, and by the oration which he delivered over his body, excited the people to anger and revenge, and the murderers were obliged to flee. After several quarrels and reconciliations with Octavianus, Cæsar's heir (see Augustus), Antony departed to Cisalpine Gaul, which province had been conferred upon him against the will of the senate. But Cicero thundered against him in his famous Philippics; the senate declared him a public enemy, and



intrusted the conduct of the war against him to Octavianus and the consuls Hirtius and Pansa. After a campaign of varied fortunes Antony fled with his troops over the Alps. Here he was joined by Lepidus, who commanded in Gaul, and through whose mediation Antony and Octavianus were again reconciled. It was agreed that the Roman world should be divided among the three conspirators, who were called triumvirs. Antony was to take Gaul; Lepidus, Spain; and Octavianus, Africa and Sicily. They decided upon the proscription of their mutual enemies, each giving up his friends to the others, the most celebrated of the victims being Cicero the orator. Antony and Octavianus departed in 42 for Macedonia, where the united forces of their enemies, Brutus and Cassius, formed a powerful army, which was, however, speedily defeated at Philippi. Antony next visited Athens, and thence proceeded to Asia. In Cilicia he ordered Cleopatra, queen of Egypt, to apologize for her insolent behavior to the triumviri. She appeared in person, and her charms fettered him forever. He followed her to Alexandria, where he bestowed not even a thought upon the affairs of the world, till he was aroused by a report that hostilities had commenced in Italy between his own relatives and Octavianus. A short war followed, which was decided in favor of Octavianus before the arrival of Antony in Italy. A reconciliation was effected, which was sealed by the marriage of Antony with Octavia, his sister of Octavianus. A new division of the Roman dominions was now made (in 40), by which Antony obtained the east, Octavianus the west. After his return to Asia Antony gave himself up entirely to Cleopatra, assuming the style of an Eastern despot, and so alienating many of his adherents and embittering public opinion against him at Rome. At length war was declared at Rome against the Queen of Egypt, and Antony was deprived of his consulship and government. Each party assembled its forces, and Antony lost, in the naval battle at Actium (B.C. 31), the dominion of the world. He followed Cleopatra to Alexandria, and on the arrival of Octavianus his fleet and cavalry deserted, and his infantry was defeated. Deceived by a false report which Cleopatra had disseminated of her death, he fell upon his own sword (B.C. 30).

**ANTONY, Mark.** See Antonius, Marcus.

**AN'TRIM**, a county of Ireland, province of Ulster, in the northeast of the island; area, 762,080 acres, of which about a third are arable. The eastern and northern districts are comparatively mountainous, with tracts of heath and bog, but no part rises to a great height. The principal towns are Belfast, Ballymena, and Larne. Pop. 461,240.—The town of Antrim, at the north end of Lough Neagh, is a small place with a pop. of 1385.

**ANT'WERP**, the chief port of Belgium, and the capital of a province of the same name, on the Scheldt, about 50 miles from the open sea. The cathedral, with a spire 400 feet high, one of the

largest and most beautiful specimens of Gothic architecture in Belgium, contains Rubens's celebrated masterpieces, the Descent from the Cross, the Elevation of the Cross, and The Assumption. The other churches of note are St. James's, St. Andrew's, and St. Paul's, all enriched with paintings by Rubens,



Antwerp cathedral, from the egg market.

Vandyck, and other masters. Antwerp is mentioned as early as the 8th century, and in the 11th and 12th it had attained a high degree of prosperity. In the 16th century it is said to have had a pop. of 200,000. The wars between the Netherlands and Spain greatly injured its commerce, which was almost ruined by the closing of the navigation of the Scheldt in accordance with the peace of Westphalia (1648). It was only in the 19th century that its prosperity revived.—Pop. 282,000. The province consists of a fertile plain 1100 sq. miles in area, and has a pop. of 825,156.

**A'NUS**, the opening at the lower or posterior extremity of the alimentary canal through which the excrement or waste products of digestion are expelled.

**AN'VIL**, an instrument on which pieces of metal are laid for the purpose of being hammered. The common smith's anvil is generally made of seven pieces; namely, the core or body; the four corners for the purpose of enlarging its base; the projecting end, which contains a square hole for the reception of a set or chisel to cut off pieces of iron; and the beak or conical end, used for turning pieces of iron into a circular form, etc. These pieces are each separately welded to the core and hammered so as to form a regular surface with the whole. When the anvil has received its due form it is faced with steel, and is then tempered in cold water. The smith's anvil is generally placed loose upon a wooden block. The anvil for heavy operations, such as the forging of ordnance and shafting, consists of a huge iron block deeply embedded, and resting on piles of masonry.

**AOR'TA**, in anatomy, the great artery or trunk of the arterial system, proceeding from the left ventricle of the heart,

and giving origin to all the arteries except the pulmonary. It first rises toward the top of the breast-bone, when it is called the ascending aorta; then makes a great curve, called the transverse or great arch of the aorta, whence it gives off branches to the head and upper extremities; thence proceeding toward the lower extremities, under the name of the descending aorta, it gives off branches to the trunk; and finally divides into the two ilia, which supply the pelvis and lower extremities.

**APACHES** (à-pá'chez), a warlike race of Indians inhabiting the more unsettled parts of the United States adjoining Mexico, and also the north of Mexico. They live chiefly on horseback, support themselves by the chase and plunder, and they still maintain their independence and hostility to the whites.

**AP'ANAGE**, an allowance which the younger princes of a reigning house in some European countries receive from the revenues of the country, generally together with a grant of public domains, that they may be enabled to live in a manner becoming their rank.

**APARTMENT HOUSES**, houses built to accommodate a number of families each in its own set of rooms, which form a separate dwelling with an entrance of its own. The term is chiefly used in America, where such dwellings are of comparatively recent introduction. In New York, Chicago, and other American cities there are now great blocks of such houses, which provide excellent and commodious dwellings at a lower rent than if each were a separate building.

**APE**, a common name of a number of quadrumanous animals inhabiting the Old World (Asia and the Asiatic islands, and Africa), and including a variety of species. The word ape was formerly applied indiscriminately to all quadrumanous mammals; but it is now limited to the anthropoid or man-like monkeys. The family includes the chimpanzee, gorilla, orang-outang, etc., and has been divided into three genera, Troglodytes, Simia, and Hylobates. See Chimpanzee, Gibbon, Gorilla, Orang, etc.

**AP'ENNINES**, a prolongation of the Alps, forming the "backbone of Italy." Beginning at Savona, on the Gulf of Genoa, the Apennines traverse the whole of the peninsula and also cross over into Sicily, the Strait of Messina being regarded merely as a gap in the chain. The average height of the mountains composing the range is about 4000 feet, and nowhere do they reach the limits of perpetual snow, though some summits exceed 9000 feet in height. Monte Corno, called also Gran Sasso d'Italia (Great Rock of Italy), which rises among the mountains of the Abruzzi, is the loftiest of the chain, rising to the height of 9541 feet, Monte Majella (9151) being next. Monte Gargano, which juts out into the Adriatic from the ankle of Italy, is a mountainous mass upward of 5000 feet high, completely separated from the main chain. On the Adriatic side the mountains descend more abruptly to the sea than on the western or Mediterranean side, and the streams are comparatively short and rapid. On the western side are the valleys of the Arno, Tiber, Garigliano, and Volturno, the



largest rivers that rise in the Apennines, and the only ones of importance in the peninsular portion of Italy. They consist almost entirely of limestone rocks, and are exceedingly rich in the finest marbles. On the south slopes volcanic masses are not uncommon. Mount Vesuvius, the only active volcano on the continent of Europe, is an instance. The lower slopes are well clothed with vegetation, the summits are sterile and bare.

**APERIENT**, a medicine which, in moderate doses, gently but completely opens the bowels: examples, castor-oil, Epsom salts, senna, etc.

**APHA'SIA**, in pathology, a symptom of certain morbid conditions of the nervous system, in which the patient loses the power of expressing ideas by means of words, or loses the appropriate use of words, the vocal organs the while remaining intact and the intelligence sound. There is sometimes an entire loss of words as connected with ideas, and sometimes only the loss of a few. In one form of the disease, called aphemia, the patient can think and write, but cannot speak; in another, called agraphia, he can think and speak, but cannot express his ideas in writing. In a great majority of cases, where post-mortem examinations have been made, morbid changes have been found in the left frontal convolution of the brain.

**APHE'LION**, that part of the orbit of the earth or any other planet in which it is at the point remotest from the sun.

**APHO'NIA**, in pathology, the greater or less impairment, or the complete loss of the power of emitting vocal sound. The slightest and less permanent forms often arise from extreme nervousness, fright, and hysteria. Slight forms of structural aphonia are of a catarrhal nature, resulting from more or less congestion and tumefaction of the mucous and submucous tissues of the larynx and adjoining parts. Severer cases are frequently occasioned by serious infiltration into the submucous tissue, with or without inflammation of the mucous membrane of the larynx and of its vicinity. The voice may also be affected in different degrees by inflammatory affections of the fauces and tonsils; by tumors in these situations; by morbid growths pressing on or implicating the larynx or trachea; by aneurisms; and most frequently by chronic laryngitis and its consequences, especially thickening, ulceration, etc.

**APH'ORISM**, a brief, sententious saying, in which a comprehensive meaning is involved, as "Familiarity breeds contempt"; "Necessity has no law."

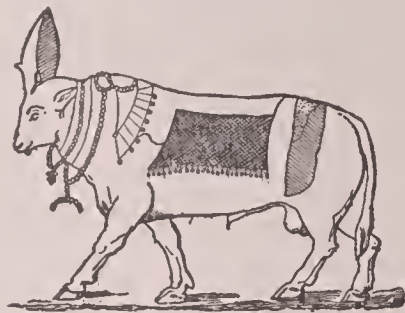
**APHRODITE** (af-ro-dī'tē), the goddess of love among the Greeks; usually regarded as equivalent to the Roman Venus. A festival called Aphrodisia was celebrated to her in various parts of Greece, but especially in Cyprus. See Venus.

**APHTHÆ** (af'thē), a disease occurring especially in infants, but occasionally seen in old persons, and consisting of small white ulcers upon the tongue, gums, inside of the lips, and palate, resembling particles of curdled milk: commonly called thrush or milk-thrush.

**A'PIA**, the chief place and trading center of the Samoa Islands, on the north side of the island of Upolu.

**A'PIOS**, a genus of leguminous climbing plants producing edible tubers on underground shoots. An American species has been used as a substitute for the potato, but its tubers, though numerous, are small.

**A'PIS**, a bull to which divine honors were paid by the ancient Egyptians, who regarded him as a symbol of Osiris. At Memphis he had a splendid residence, containing extensive walks and courts



Apis.

for his entertainment, and he was waited upon by a large train of priests, who looked upon his every movement as oracular. He was not suffered to live beyond twenty-five years, being secretly killed by the priests and thrown into a sacred well. Another bull, characterized by certain marks, as a black color, a triangle of white on the forehead, a white crescent-shaped spot on the right side, etc., was selected in his place. His birthday was annually celebrated, and his death was a season of public mourning.

**A'PIUM**, a genus of umbelliferous plants, including celery.

**APLANATIC**, in optics, a term specifically applied to reflectors, lenses, and combinations of them, capable of transmitting light without spherical aberration. An aplanatic lens is a lens constructed of different media to correct the effects of the unequal refrangibility of the different rays.

**APOC'ALYPSE**, the name frequently given to the last book of the New Testament, in the English version called The Revelation of St. John the Divine. It is generally believed that the Apocalypse was written by the apostle John in his old age (95-97 A.D.) in the Isle of Patmos, whither he had been banished by the Roman Emperor Domitian. Anciently its genuineness was maintained by Justin Martyr, Irenæus, Clement of Alexandria, Tertullian, and many others; while it was doubted by Dionysius of Alexandria, Cyril of Jerusalem, Chrysostom, and, nearer our own times, by Luther and a majority of the eminent German commentators. The Apocalypse has been explained differently by almost every writer who has ventured to interpret it, and has furnished all sorts of sects and fanatics with quotations to support their creeds or pretensions. The modern interpreters may be divided into three schools—namely, the historical school, who hold that the prophecy embraces the whole history of the church and its foes

from the time of its writing to the end of the world; the Præterists, who hold that the whole or nearly the whole of the prophecy has been already fulfilled, and that it refers chiefly to the triumph of Christianity over Paganism and Judaism; and the Futurists, who throw the whole prophecy, except the first three chapters, forward upon a time not yet reached by the church—a period of no very long duration, which is immediately to precede Christ's second coming.

**APOCALYPTIC NUMBER**, the mystic number 666 found in Rev. xiii. 18. As early as the 2d century ecclesiastical writers found that the name Antichrist was indicated by the Greek characters expressive of this number. By Irenæus the word Lateinos was found in the letters of the number, and the Roman empire was therefore considered to be Antichrist. Protestants generally believe it has reference to the Papacy, and, on the other hand, Catholics connect it with Protestantism.

**APOCAR'POUS**, in botany, a term applied to such fruits as are the produce of a single flower, and are formed of one carpel, or a number of carpels free and separate from each other.

**APOC'RYPHA**, a term applied in the earliest churches to various sacred or professedly inspired writings, sometimes given to those whose authors were unknown, sometimes to those with a hidden meaning, and sometimes to those considered objectionable. The term is specially applied to the fourteen undermentioned books which were written during the two centuries preceding the birth of Christ: the first and second Books of Esdras, Tobit, Judith, the rest of the Book of Esther, the Wisdom of Solomon, the Wisdom of Jesus the son of Sirach, or Ecclesiasticus, Baruch the Prophet, the Song of the Three Children, Susanna and the Elders, Bel and the Dragon, the Prayer of Manasses, and the first and second Books of Macca-bees.

**AP'OGEE** (-jē), that point in the orbit of the moon or a planet where it is at its greatest distance from the earth; properly this particular part of the moon's orbit.

**APOLLINA'RIS WATER**, a natural aerated water, belonging to the class of acidulated soda waters, and derived from the Apollinarisbrunnen, a spring in the valley of the Ahr, near the Rhine, in Rhenish Prussia, forming a highly esteemed beverage.

**APOL'LO**, son of Zeus (Jupiter) and Leto (Latona), who, being persecuted by the jealousy of Hera (Juno), after tedious wanderings and nine days' labor, was delivered of him and his twin sister, Artémis (Diana), on the island of Delos. Skilled in the use of the bow, he slew the serpent Python on the fifth day after his birth; afterward, with his sister Artémis, he killed the children of Niobë. He aided Zeus in the war with the Titans and the giants. He destroyed the Cyclopes, because they forged the thunderbolts with which Zeus killed his son and favorite Asklepios (Æsculapius). According to some traditions he invented the lyre, though this is generally ascribed to Hermes (Mercury). Apollo was originally the sun-god; and



though in Homer he appears distinct from Helios (the sun), yet his real nature is hinted at even here by the epithet Phœbus, that is, the radiant or beaming. In later times the view was almost universal that Apollo and Helios were identical. From being the god of light and purity in a physical sense he



Apollo, from a bas-relief at Rome.

gradually became the god of moral and spiritual light and purity, the source of all intellectual, social, and political progress. He thus came to be regarded as the god of song and prophecy, the god that wards off and heals bodily suffering and disease, the institutor and guardian of civil and political order, and the founder of cities. His worship was introduced at Rome at an early period, probably in the time of the Tarquins. Among the ancient statues of Apollo that have come down to us, the most remarkable is the one called the Apollo Belvidere, from the Belvidere Gallery in the Vatican at Rome. This statue was found in the ruins of Antium in 1503, and was purchased by Pope Julian II. It is now supposed to be a copy of a Greek statue of the third century B.C., and dates probably from the reign of Nero.

**APOLOGUE** (ap'o-log), a story or relation of fictitious events intended to convey some useful truths. It differs from a parable in that the latter is drawn from events that pass among mankind, whereas the apologue may be founded on supposed actions of brutes or inanimate things. Æsop's fables are good examples of apologies.

**APOL'OGY**, a term at one time applied to a defense of one who is accused, or of certain doctrines called in question. Of this nature are the Apologies of Socrates, attributed respectively to Plato and Xenophon. The name passed over to Christian authors, who gave the name of apologies to the writings which were designed to defend Christianity against the attacks and accusations of its enemies, particularly the pagan philosophers, and to justify its professors before the emperors. Of this sort were those by Justin Martyr, Athenagoras, Tertullian, Tatian, and others.

**APOPHTHEGM** (ap'o-them), a short pithy sentence or maxim. Julius Cæsar wrote a collection of them, and we have a collection by Lord Bacon.

**AP'OPLEXY**, abolition or sudden diminution of sensation and voluntary motion, from suspension of the functions of the cerebrum, resulting from congestion or rupture of the blood-vessels of the brain and resulting pressure on this organ. In a complete apoplexy the person falls suddenly, is unable to move his limbs or to speak, gives no proof of seeing, hearing, or feeling, and the breathing is stertorous or snoring, like that of a person in deep sleep. The premonitory symptoms of this dangerous disease are drowsiness, giddiness, dulness of hearing, frequent yawning, disordered vision, noise in the ears, vertigo, etc. It is most frequent between the ages of fifty and seventy. A large head, short neck, full chest, sanguine and plethoric constitution, and corpulency are generally considered signs of predisposition to it; but the state of the heart's action, with a plethoric condition of the vascular system, has a more marked influence. Out of 63 cases carefully investigated only 10 were fat and plethoric, 23 being thin, and the rest of ordinary habit. Among the common predisposing causes are long and intense thought, continued anxiety, habitual indulgence of the temper and passions, sedentary and luxurious living, sexual indulgence, intoxication, etc. More or less complete recovery from a first and second attack is common, but a third is almost invariably fatal.

**APOSTASY**, a renunciation of opinions or practices and the adoption of contrary ones, usually applied to renunciation of religious opinions. It is always an expression of reproach. What one party calls apostasy is termed by the other conversion. Catholics, also, call those persons apostates who forsake a religious order or renounce their religious vows without a lawful dispensation.

**A POSTERIO'RI**. See *A priori*.

**APOST'LES**, the twelve men whom Jesus selected to attend him during his ministry, and to promulgate his religion. Their names were as follows: Simon Peter, and Andrew his brother; James, and John his brother, sons of Zebedee; Philip; Bartholomew; Thomas; Matthew; James, the son of Alphaeus; Lebbeus his brother, called Judas or Jude; Simon, the Canaanite; and Judas Iscariot. To these were subsequently added Matthias (chosen by lot in place of Judas Iscariot) and Paul. The Bible gives the name of apostle to Barnabas also, who accompanied Paul on his missions (Acts xiv. 14). In a wider sense those preachers who first taught Christianity in heathen countries are sometimes termed apostles; for example, St. Denis, the apostle of the Gauls; St. Boniface, the apostle of Germany; St. Augustin, the apostle of England; Francis Xavier, the apostle of the Indies; Adalbert of Prague, apostle of Prussia Proper. During the life of the Savior the apostles more than once showed a misunderstanding of the object of his mission, and during his sufferings evinced little courage and firmness of friendship for their great and benevolent Teacher. After his death they received the Holy Ghost on the

day of Pentecost, that they might be enabled to fulfil the important duties for which they had been chosen. Their subsequent history is only imperfectly known. According to one interpretation of Matthew xvi. 18 Christ seems to appoint St. Peter the first of the apostles; and the pope claims supreme authority from the power which Christ thus gave to St. Peter, of whom all the popes, according to the Catholic dogma, are successors in an uninterrupted line.

**APOSTLES' CREED**, a well-known formula or declaration of Christian belief, formerly believed to be the work of the apostles themselves, but it can only be traced to the 4th century. See *Creed*.

**APOS'TROPHE**, a rhetorical figure by which the orator changes the course of his speech, and makes a short impassioned address to one absent as if he were present, or to things without life and sense as if they had life and sense. The same term is also applied to a comma when used to contract a word, or to mark the possessive case, as in "John's book."

**APOTH'ECARY**, in a general sense, one who keeps a shop or laboratory for preparing, compounding, and vending medicines, and for the making up of medical prescriptions.

**APOTHEO'SIS**, a solemnity among the ancients by which a mortal was raised to the rank of the gods.

**APPALACHIAN MOUNTAINS** (ap-pa-lā'chi-an), also called Alleghanies, a vast mountain range in N. America extending for 1300 miles from Cape Gaspé, on the Gulf of St. Lawrence, s.w. to Alabama. The system has been divided into three great sections: the northern (including the Adirondacks, the Green Mountains, the White Mountains, etc.), from Cape Gaspé to New York; the central (including a large portion of the Blue Ridge, the Alleghanies proper, and numerous lesser ranges), from New York to the valley of the New River; and the southern (including the continuation of the Blue Ridge, the Black Mountains, the Smoky Mountains, etc.), from the New River southward. The chain consists of several ranges generally parallel to each other, the altitude of the individual mountains increasing on approaching the south. The highest peaks rise over 6600 feet (not one at all approaching the snow-level), but the mean height is about 2500 feet. Lake Champlain is the only lake of great importance in the system, but numerous rivers of considerable size take their rise here. Magnetite, hematite, and other iron ores occur in great abundance, and the coal-measures are among the most extensive in the world. Gold, silver, lead, and copper are also found, but not in paying quantities, while marble, limestone, fire-clay, gypsum, and salt abound. The forests covering many of the ranges yield large quantities of valuable timber, such as sugar-maple, white birch, beech, ash, oak, cherry tree, white poplar, white and yellow pine, etc., while they form the haunts of large numbers of bears, panthers, wild cats, and wolves.

**APPANAGE**. See *Apanage*.

**APPAR'ENT**, among mathematicians and astronomers, applied to things as



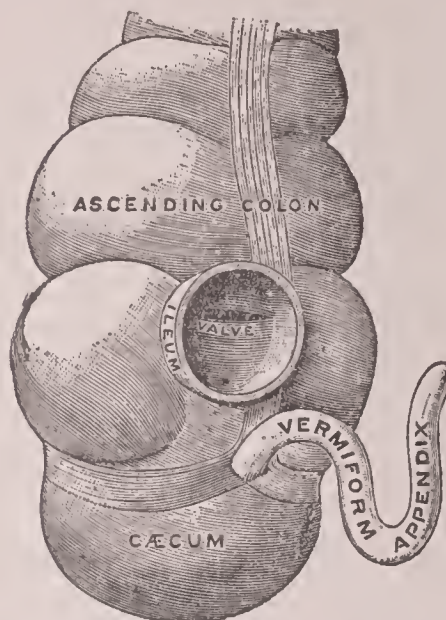
they appear to the eye, in distinction from what they really are. Thus they speak of apparent motion, magnitude, distance, height, etc. The apparent magnitude of a heavenly body is the angle subtended at the spectator's eye by the diameter of that body, and this, of course, depends on the distance as well as the real magnitude of the body; apparent motion is the motion a body seems to have in consequence of our own motion, as the motion of the sun from east to west, etc.

**APPARITION**, according to a belief held by some, a disembodied spirit manifesting itself to mortal sight; according to the common theory an illusion involuntarily generated, by means of which figures or forms, not present to the actual sense, are nevertheless depicted with a vividness and intensity sufficient to create a temporary belief of their reality. Such illusions are now generally held to result from an over-excited brain, a strong imagination, or some bodily malady. In perfect health the mind not only possesses a control over its powers, but the impressions of the external objects alone occupy its attention, and the play of imagination is consequently checked, except in sleep, when its operations are relatively more feeble and faint. But in the unhealthy state of the mind, when its attention is partly withdrawn from the contemplation of external objects, the impressions of its own creation, or rather reproduction, will either overpower or combine themselves with the impressions of external objects, and thus generate illusions which in the one case appear alone, while in the other they are seen projected among those external objects to which the eyeball is directed. This theory explains satisfactorily a large majority of the stories of apparitions; still there are some which it seems insufficient to account for. In recent times, though the belief in ghosts of the old and orthodox class may be said to have almost died out, a new and kindred faith has arisen, that of Spiritualism.

**APPEAL**, in legal phraseology, the removal of a cause from an inferior tribunal to a superior, in order that the latter may revise, and if it seem needful reverse or amend, the decision of the former.

**APPENDICITIS**, an inflammation of the vermiform appendix. The V. appendix is found in all except a very few mammals, and varies in size from a mere rudiment to a large and very useful part of the intestine. It is smallest in flesh-eating animals, and in man is from three to six inches long, with a diameter about that of an ordinary lead pencil or less. It comes off the cæcum, or blind gut, of the large intestine and, in man, has no function whatsoever. As it opens upon the intestine, it sometimes receives foreign substances, including bacteria, the irritation from which sets up inflammation which is often followed by suppuration and perforation, necessitating an operation by which it is removed. Appendicectomy (the operation) is now commonplace and safe. Typical symptoms of appendicitis are pain in the region (right side of the abdomen below the navel), fever, constipation, and

pain on pressure. These four symptoms usually accompany the disease. Early operation has saved thousands of lives which otherwise would have been lost through inflammation of the appendix.



Large intestine, showing the appendix.

Autopsies show that two-thirds of the human race are afflicted with appendicitis. The disease is comparatively rare in persons past middle life.

**AP'PETITE**, in its widest sense, means the natural desire for gratification, either of the body or the mind; but is generally applied to the recurrent and intermittent desire for food. A healthy appetite is favored by work, exercise, plain living, and cheerfulness; absence of this feeling, or defective appetite, indicates diseased action of the stomach, or of the nervous system or circulation, or it may result from vicious habits. Depraved appetite, or a desire for unnatural food, as chalk, ashes, dirt, soap, etc., depends often in the case of children on vicious tastes or habits; in grown up persons it may be symptomatic of dyspepsia, pregnancy, or chlorosis. Insatiable or canine appetite or voracity when it occurs in childhood is generally symptomatic of worms; in adults common causes are pregnancy, vicious habits, and indigestion caused by stomach complaints or gluttony, when the gnawing pains of disease are mistaken for hunger.



Construction of the Appian Way.

**APPIAN WAY**, the oldest and most renowned Roman road, was constructed during the censorship of Appius Clau-

dius Cæcus (B.C. 313-310). It was built with large square stones on a raised platform, and was made direct from the gates of Rome to Capua, in Campania. It was afterward extended through Samnium and Apulia to Brundisium, the modern Brindisi. It was partially restored by Pius VI., and in 1850-53 it was excavated by order of Pius IX. as far as the eleventh milestone from Rome.

**APPIUS CLAUDIUS**, surnamed Cæcus, or the blind, an ancient Roman, elected censor B.C. 312, which office he held four years. While in this position he made every effort to weaken the power of the plebs, and constructed the road and aqueduct named after him. He was subsequently twice consul, and once dictator. In his old age he became blind, but in B.C. 280 he made a famous speech in which he induced the senate to reject the terms of peace fixed by Pyrrhus. He is the earliest Roman writer of prose and verse whose name we know.

**APPIUS CLAUDIUS CRASSUS**, one of the Roman decemvirs, appointed B.C. 451 to draw up a new code of laws. He and his colleagues plotted to retain their power permanently, and at the expiry of their year of office refused to give up their authority. The people were incensed against them, and the following circumstances led to their overthrow. Appius Claudius had conceived an evil passion for Virginia, the daughter of Lucius Virginius, then absent with the army in the war with the Æqui and Sabines. At the instigation of Appius, Marcus Claudius, one of his clients, claimed Virginia as the daughter of one of his own female slaves, and the decemvir, acting as judge, decided that in the meantime she should remain in the custody of the claimant. Virginius, hastily summoned from the army, appeared with his daughter next day in the forum, and appealed to the people; but Appius Claudius again adjudged her to Marcus Claudius. Unable to rescue his daughter, the unhappy father stabbed her to the heart. The decemvirs were deposed by the indignant people B.C. 449, and Appius Claudius died in prison or was strangled.

**APPLE**, the fruit of a well-known tree of the nat. order Rosaceæ, or the tree itself. The apple belongs to the temperate regions of the globe, over which it is almost universally spread and cultivated. The tree attains a moderate height, with spreading branches; the leaf is ovate; and the flowers are produced from the wood of the former year, but more generally from very short shoots or spurs from wood of two years' growth. The original of all the varieties of the cultivated apple is the wild crab, which has a small and extremely sour fruit, and is a native of most of the countries of Europe. The apple was probably introduced into Britain by the Romans. To the facility of multiplying varieties by grafting is to be ascribed the amazing extension of the sorts of apples. Many of the more marked varieties are known by general names, as pippins, codlins, rennets, etc. Apples for the table are characterized by a firm juicy pulp, a sweetish acid flavor, regular form, and beautiful



coloring; those for cooking by the property of forming by the aid of heat into a pulpy mass of equal consistency, as also by their large size and keeping properties; apples for cider must have a considerable degree of astringency, with richness of juice. The propagation of apple-trees is accomplished by seeds, cuttings, suckers, layers, budding, or grafting, the last being almost the universal practice. The tree thrives best in a rich deep loam or marshy clay, but will thrive in any soil provided it is not too wet or too dry. The wood of the apple-tree or the common crab is hard, close-grained, and often richly colored, and is suitable for turning and cabinet work. The fermented juice of the crab is employed in cookery and medicine.

**APPLE OF DISCORD**, according to the story in the Greek mythology, the golden apple thrown into an assembly of the gods by the goddess of discord (Eris), bearing the inscription "for the fairest." Aphrodītē (Venus), Hera (Juno), and Pallas (Minerva) became competitors for it, and its adjudication to the first by Paris so inflamed the jealousy and hatred of Hera to all of the Trojan race (to which Paris belonged)



Apricot.

that she did not cease her machinations till Troy was destroyed.

**APPLE OF SODOM**, a fruit described by old writers as externally of fair appearance, but turning to ashes when poked; probably the fruit of *Solanum sodomæum*.

**AP'PLETON**, a city and the county seat of Outagamie Co., Wis., 100 miles n.w. of Milwaukee, on the Chicago and Northwestern, and Chicago, Milwaukee, and St. Paul railroads. It is situated on the falls of the Fox river, which by a series of dams is navigable for steamboats, and, with a fall of about fifty feet, supplies extensive water power for various manufactures, of which paper is the most important. Pop. 17,185.

**APPOGGIATURA** (ap-poj-ā-tō'rā), in music, a small additional note of embellishment preceding the note to which it is attached, and taking away from the principal note a portion of its time.

**APPOINTMENT**, a term in English law signifying the exercise of some power, reserved in a conveyance or settlement, of burdening, selling, or otherwise disposing of the lands or

property conveyed. Such a reserved power is termed a power of appointment.

**APPOMATTOX COURT-HOUSE**, a village in Virginia, 20 miles e. of Lynchburg. Here, on 9th April, 1865, Gen. Lee surrendered to Gen. Grant, and thus virtually concluded the civil war.

**APPOR'TIONMENT**, the process by which congress, after each census, fixes the number of representatives to which the various states of the union are entitled. The first apportionment was fixed by the constitution, every 30,000 population being entitled to a representative. The number grew with each decade until now, with 45 states in the union, instead of 13, each constituency has 193,175 population, with a total of 386 representatives.

**APPOSITION**, in grammar, the relation in which one or more nouns or substantive phrases or clauses stand to a noun or pronoun, which they explain or characterize without being predicated of it, and with which they agree in case; as Cicero, the orator, lived in the first century before Christ; the opinion, that a severe winter is generally followed by a good summer, is a vulgar error.

**APPRAIS'ER**, a person employed to value property, and duly licensed to do so by license taken out every year. The valuation must be duly set down in writing, and there is a certain fixed scale of charges for the appraiser's services.

**APPREHEN'SION**, the seizing of a person as a criminal whether taken in the act or on suspicion, and with or without a warrant, a warrant being necessary when the person apprehending is not present at the commission of the offense. See Arrest.

**APPREN'TICE**, one bound by indenture to serve some particular individual or company of individuals for a specified time, in order to be instructed in some art, science, or trade.

**APPROPRIA'TION**, the act of designating a certain sum of money, or of other property, for a specific use, as an appropriation for the army, navy, police, etc. In the United States the constitution provides that "no money shall be drawn from the treasury but in consequence of appropriations made by law."

**APPROXIMA'TION**, a term used in mathematics to signify a continual approach to a quantity required, when no process is known for arriving at it exactly. Although, by such an approximation, the exact value of a quantity cannot be discovered, yet, in practice, it may be found sufficiently correct; thus the diagonal of a square, whose sides are represented by unity, is  $\sqrt{2}$ , the exact value of which quantity cannot be obtained; but its approximate value may be substituted in the nicest calculations.

**A'PRICOT**, a fruit of the plum genus which was introduced into Europe from Asia more than three centuries before Christ, and into England in the first half of the 16th century. It is a native of Armenia and other parts of Asia and also of Africa. The apricot is a low tree, of rather crooked growth, with somewhat heart-shaped leaves and sessile flowers. The fruit is sweet, more

or less juicy, of a yellowish color, about the size of the peach, and resembling it in delicacy of flavor. The wood is coarsely grained and soft. Apricot-trees are chiefly raised against walls, and are propagated by budding and grafting.

**APRIES** (ā'pri-ēz), Pharaoh-Hophras of Scripture, the eighth king of the twenty-sixth Egyptian dynasty. He succeeded his father Psamuthius in 590 or 588 B.C. The Jews under Zedekiah revolted against their Babylonian oppressors and allied themselves with Apries, who was, however, unable to raise the siege of Jerusalem, which was taken by Nebuchadnezzar. A still more unfortunate expedition against Cyrene brought about revolt in his army, in endeavoring to suppress which Apries was defeated and slain about B.C. 569.

**A'PRIL**, the fourth month of the year. The strange custom of making fools on the 1st of April by sending people upon errands and expeditions which end in disappointment, and raise a laugh at the expense of the person sent, has been connected with the miracle plays of the middle ages, in which the Savior was represented as having been sent, at this period of the year, from Annas to Caiaphas and from Pilate to Herod.

**A PRIO'RI** ("from what goes before"), a phrase applied to a mode of reasoning by which we proceed from general principles or notions to particular cases, as opposed to a posteriori



Apteryx.

("from what comes after") reasoning, by which we proceed from knowledge previously acquired. Mathematical proofs are of the a priori kind; the conclusions of experimental science are a posteriori. It is also a term applied to knowledge independent of all experience.

**AP'SIS**, pl. **AP'SIDES** or **APSI'DES**, in astron. one of the two points of the orbit of a heavenly body situated at the extremities of the major axis of the ellipse formed by the orbit, one of the points being that at which the body is at its greatest and the other that at which it is at its least distance from its primary. In regard to the earth and the other planets, these two points correspond to the aphelion and perihelion; and in regard to the moon they correspond to the apogee and perigee. The line of the apsides has a slow forward angular motion in the plane of the planet's orbit, being retrograde only in Venus. This in the earth's orbit produces the anomalistic year. See Anomaly.

**AP'TERYX**, a nearly extinct genus of cursorial birds, distinguished from the









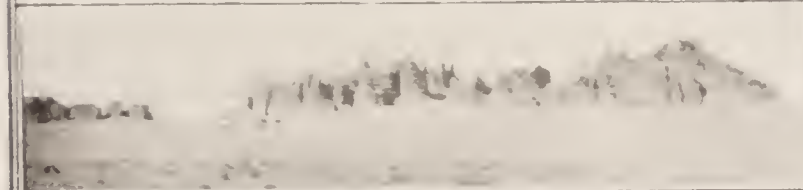
In an Ottoman Mosque



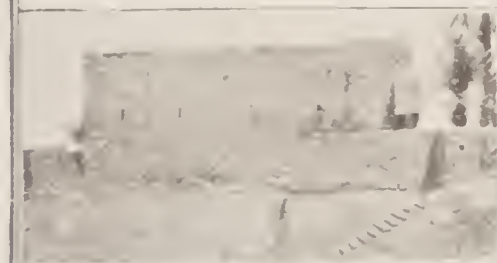
The Sultan's Pew at Constantinople



New Mosque where Mahomed Kneelt in Prayer at Tebuk



Strange Results of Erosion at Medain Salch  
Sandstone ridge 400 ft. high of a deep red color worn by wind and rain



Old Guardhouse on Pilgrim's Way



Great Rock Tomb at Nabathean City of Medain Salch  
Dating from the first century of Christian era



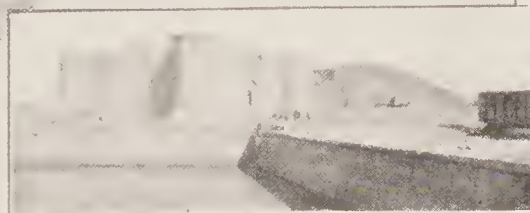
Tunnel on the Mecca Railway



The Railway Track Beneath the Shadow of Rocks



Pilgrims on the Derb-el-Haj, or Pilgrim's Way to Mecca



Old Fort at Kalaat Muadhdham



Railway Station on Mecca Line



Railway Station at Maan



Inspection Carriage on Mecca Railway



The Holy City of Medina  
Where Mahomed has buried



The Crowd of Pilgrims in Mecca

The bird's-eye view of the new Mecca Railway has been drawn with the aid of some of the most recent maps of the district. An excellent geographical chart will be found in Mr D. G. Hogarth's Arabia, where the heights of the hills and mountain ranges are shown with much greater accuracy than in the ordinary atlases.

The Hedjaz Railway is rapidly nearing the holy places of Islam. The construction of the line has recently been very rapid. The importance of the line is, of course, mainly strategical and religious. When completed it will rivet the grasp of the Turk on the sacred places of Mecca and Medina and may in time be used as a base for the despatch of troops to the independent emirates of Hail and Riadh in Nejd. The new line closely follows the track of the old pilgrims' way. The chief northerly port is Damascus from which the railway extends south it reaches Medain Salch and El Alla spots which contain some extraordinary rock tombs. From these points it reaches Medina, and after passing the holy city it reaches Mecca, the sacred city of Mahomed, at which point the pilgrims mingle with the human streams coming from Suez and Port Sudan.



ostriches by having three toes with a rudimentary hallux, which forms a spur. They are natives of the South Island of New Zealand; are totally wingless and tailless, with feathers resembling hairs; about the size of a small goose; with long beak some-thing like that of a curlew. They are entirely nocturnal, feeding on insects, worms, and seeds.

**APULEIUS**, or **APPULEIUS** (ap-ū-lē'us), author of the celebrated satirical romance in Latin called the Golden Ass, born at Madaura, in Numidia, in the early part of the 2d century A.D.; the time of his death unknown.

**APU'LIA**, a department or division in the southeast of Italy, on the Adriatic, composed of the provinces of Foggia, Bari, and Lecce; area, 8539 sq. miles; pop. 1,949,423.

**A'QUA**, a word much used in pharmacy and old chemistry.—Aqua fortis (= strong water), a weak and impure nitric acid. It has the power of eating into steel and copper, and hence is used by engravers, etchers, etc.—Aqua marina, a fine variety of beryl. See Aquamarine.—Aqua regia, or aqua regalis (= royal water), a mixture of nitric and hydrochloric acids, with the power of dissolving gold and other noble metals.—Aqua Tofana, a poisonous fluid made about the middle of the 17th century by an Italian woman Tofana or Toffania, who is said to have procured the death of no fewer than 600 individuals by means of it. It consisted chiefly, it is supposed, of a solution of crystallized arsenic.—Aqua vitæ (= water of life), or simply aqua, a name familiarly applied to the whisky of Scotland, corresponding in meaning with the usquebaugh of Ireland, the eau de vie (brandy) of the French.

**AQUA FORTIS**. See above article.

**A'QUAMARINE'**, a name given to some of the finest varieties of beryl of a sea-green or blue color. Varieties of topaz are also so called.

**AQUA'RIMUM**, a vessel or series of vessels constructed wholly or partly of glass and containing salt or fresh water in which are kept living specimens of marine or fresh-water animals along with aquatic plants.

**AQUARIUS**, the Water-bearer; a sign in the zodiac which the sun enters about the 21st of January: so called from the rains which prevail at that season in Italy and the East.

**AQUATINT**, a method of etching on copper by which a beautiful effect is produced, resembling a fine drawing in sepia or Indian ink. The special character of the effect is the result of sprinkling finely powdered resin or mastic over the plate, and causing this to adhere by heat, the design being previously etched, or being now traced out. The nitric acid (aqua fortis) acts only in the interstices between the particles of resin or mastic, thus giving a slightly granular appearance.

**A'QUEDUCT**, an artificial channel or conduit for the conveyance of water from one place to another: more particularly applied to structures for conveying water from distant sources for the supply of large cities. Aqueducts were extensively used by the Romans and,

many of them still remain in different places on the Continent of Europe, some being still in use. The Pont du Gard in the south of France, 14 miles from Nîmes, is still nearly perfect, and is a grand monument of the Roman occupation of this country. The ancient aqueducts were constructed of stone or brick, sometimes tunneled through hills, and carried over valleys and rivers on arches. The Pont du Gard is built of great blocks of stone; its height is 160 feet; length of the highest arcade, 882 feet. The aqueduct at Segovia, originally built by the Romans, has in some parts two tiers of arcades 100 feet high, is 2921 feet in length, and is one of the most admired works of antiquity. One of the most remarkable aqueducts of modern times is that constructed by Louis XIV. for conveying the waters of the Eure to Versailles. The extensive application of metal pipes has rendered the construction of aqueducts of the old type unnecessary; but what may be called aqueduct bridges are still frequently constructed in connection with water-works for the supply of towns, and where canals exist canal aqueducts are common, since the water in a canal must be kept on a perfect level. In the United States there are some important aqueducts, as the Croton, about 40½ miles long, bringing water to New York.

**A'QUEOUS HUMOR**, the limpid watery fluid which fills the space between the cornea and the crystalline lens in the eye.

**AQUEOUS ROCKS**, mechanically formed rocks, composed of matter deposited by water. Called also sedimentary or stratified rocks. See Geology.

**AQUIFOLIA'CEÆ**, a nat. order of plants; the holly tribe. The species consist of trees and shrubs, and the order includes the common holly and the Paraguayan tea tree.

**AQUILA** (āk'wē-lā), a town in Italy, capital of the province of Aquila, 55 miles northeast of Rome. Pop. 14,720.—The province has an area of 2509 sq. miles, a population of 371,332.

**AQUINAS** (a-kwi'nas), St. Thomas, a celebrated scholastic divine, born about 1227, died in 1274; descended from the counts of Aquino, in the Kingdom of the Two Sicilies. He was educated at the Benedictine monastery of Monte Casino, and at the University of Naples, where he studied for six years. In 1257 he received the degree of doctor from the Sorbonne, and began to lecture on theology, rapidly acquiring the highest reputation. In 1263 he had been offered the archbishopric of Naples by Clement IV., but refused the offer. He died on his way to Lyons to attend a general council for the purpose of uniting the Greek and Latin Churches.

**ARABESQUE** (ar'a-besk), a species of ornamentation for enriching flat surfaces, often consisting of fanciful figures, human or animal, combined with floral forms. There may be said to be three periods and distinctive varieties of arabesque: (a) the Roman or Græco-Roman, introduced into Rome from the East when pure art was declining; (b) the Arabesque of the Moors as seen in the Alhambra, introduced by them into

Europe in the middle ages; (c) Modern Arabesque, which took its rise in Italy in the Renaissance period of art. The arabesques of the Moors, who are prohibited by their religion from repre-



Renaissance Arabesque.

senting animal forms, consist essentially of complicated ornamental designs based on the suggestion of plant-growth, combined with extremely complex geometrical forms.

**ARA'BI PASHA**, Egyptian soldier and revolutionary leader, born 1837. In Sept., 1881, he headed a military revolt, and was for a time virtually dictator of Egypt. Britain interfered, and after a short campaign, beginning with the bombardment of Alexandria and ending with the defeat of Arabi and his army at Tel-el-Kebir, he surrendered, and was banished to Ceylon.

**ARA'BIA**, a vast peninsula in the s.w. of Asia, bounded on the n. by the great Syro-Babylonian plain, n.e. by the Persian Gulf and the Sea of Oman, s. or s.e. by the Indian Ocean, and s.w. by the Red Sea and Gulf of Suez. Its length from n.w. to s.e. is about 1800 miles, its mean breadth about 600 miles, its area rather over 1,000,000 sq. miles, its pop. probably not more than 6,000,000. Roughly described, it exhibits a central tableland surrounded by a series of deserts, with numerous scattered oases, while around this is a line of mountains parallel to and approaching the coasts, and with a narrow rim of low grounds between them and the sea. In its general features Arabia resembles the Sahara, of which it may be considered a continuation. Like the Sahara it has its wastes of loose sand, its stretches of bare rocks and stones, its mountains devoid of vegetation, its oases with their wells and streams, their palm-groves and cultivated fields— islands of green amid the surrounding desolation. Rivers proper there are none. The chief towns are Mecca, the birthplace of Mohammed; Medina, the place to which he fled from Mecca (A.D. 622), and where he is buried; Hodeida, a seaport exporting Mocha coffee; Aden, on the s.w. coast, a strongly fortified garrison belonging to Britain; Sana, the capital of Yemen; and Muscat, the capital of Oman, a busy port with a safe anchorage. The chief towns of the interior are Hail, the residence of the emir of northern Nejd; Oneizah, under the same ruler; and Riad, capital of southern Nejd. The most flourishing portions of Arabia are in Oman, Hadramaut, and Nejd. In the two former are localities with numerous towns and villages and settled industrious populations like that of Hindustan or Europe.

The climate of Arabia in general is marked by extreme heat and dryness. The date-palm furnishes the staple article of food; the cereals are wheat,



barley, maize, and millet; various sorts of fruit flourish; coffee and many aromatic plants and substances, such as gum-arabic, benzoin, mastic, balsam, aloes, myrrh, frankincense, etc., are produced. There are also cultivated in different parts of the peninsula, according to the soil and climate, beans, rice, lentils, tobacco, melons, saffron, colocynth, poppies, olives, etc. Sheep, goats, oxen, the horse, the camel, ass, and mule supply man's domestic and personal wants. Among wild animals are gazelles, ostriches, the lion, panther, hyena, jackal, etc. Among mineral products are saltpeter, mineral pitch, petroleum, salt, sulphur, and several precious stones, as the carnelian, agate, and onyx.

The Arabs, as a race, are of middle stature, of a powerful though slender build, and have a skin of a more or less brownish color; in towns and the uplands often almost white. Their fea-

ture the nominal submission of the tribes inhabiting the rest of Arabia. The subjection of Hejaz has continued down to the present day; but Yemen achieved its independence in the 17th century, and maintained it till 1871, when the territory again fell into the hands of the Turks. In 1839 Aden was occupied by the British. Oman early became virtually independent of the caliphs, and grew into a well-organized kingdom. In 1507 its capital, Maskat or Muscat, was occupied by the Portuguese, who were not driven out till 1659. The Wahabis appeared toward the end of the 18th century, and took an important part in the political affairs of Arabia, but their progress was interrupted by Mohammed Ali, pasha of Egypt, and they suffered a complete defeat by Ibrahim Pasha. He extended his power over most of the country, but the events of 1840 in Syria compelled him to renounce all claims to

off in the middle of an interesting tale which she had begun to relate. In the form we possess them these tales belong to a comparatively late period, though the exact date of their composition is not known. Lane, who published a translation of a number of the tales, with valuable notes, is of opinion that they took their present form some time between 1475 and 1525. Two complete English translations have recently been printed, giving many passages that previous translators had omitted on the score of morality or decency.

**ARABIC FIGURES**, the characters 1, 2, 3, 4, 5, 6, 7, 8, 9, 0; of Indian origin, introduced into Europe by the Moors. They did not come into general use till after the invention of printing.

**AR'ACK**, a spirituous liquor manufactured in the East Indies from a great variety of substances. It is often distilled from fermented rice, or it may be distilled from the juice of the cocoanut and other palms. Pure arack is clear and transparent, with a yellowish or straw color, and a peculiar but agreeable taste and smell; it contains at least 52 to 54 per cent of alcohol.

**AR'AGO**, Dominique François, a French physicist, born in 1786; died at Paris in 1853. After studying in the Polytechnic School at Paris, he was appointed a secretary of the Bureau des Longitudes. In 1809 he was elected to the Academy of Sciences, and appointed a professor of the Polytechnic School. He distinguished himself by his researches in the polarization of light, galvanism, magnetism, astronomy, etc. His discovery of the magnetic properties of substances devoid of iron, made known to the Academy of Sciences in 1824, procured him the Copley medal of the Royal Society of London in 1825. A further consideration of the same subject led to the equally remarkable discovery of the production of magnetism by electricity.

**ARAGON'**, Kingdom of, a former province or kingdom of Spain, now divided into the three provinces of Teruel, Huesca, and Saragossa; bounded on the n. by the Pyrenees, n.w. by Navarre, w. by Castile, s. by Valencia, and e. by Catalonia; length about 190 miles, average breadth 90 miles; area, 14,726 sq. miles. It was governed by its own monarchs until the union with Castile on the marriage of Ferdinand and Isabella (1469). Pop. 909,261.

**A'RAM**, Eugene, a self-taught scholar whose unhappy fate has been made the subject of a ballad by Hood and a romance by Lord Lytton, was born in Yorkshire, 1704, executed for murder, 1759.

**ARAP'AHOS**, a tribe of American Indians located near the head-waters of the Arkansas and Platte rivers, not now of any importance.

**AR'ARAT**, a celebrated mountain in Armenia, forming the point of contact of Russia with Turkey and Persia; an isolated volcanic mass showing two separate cones known as the Great and Little Ararat, resting on a common base and separated by a deep intervening depression. The elevations are: Great Ararat, 16,916 feet; Little Ararat, 12,840 feet; the connecting ridge, 8780 feet.



Bedouin Arabs.—1, 2, Of the Jordan. 3, Of the Haïran, 4, 5, Of the Desert.

tures are well cut, the nose straight, the forehead high. They are naturally active, intelligent, and courteous; and their character is marked by temperance, bravery, and hospitality. The first religion of the Arabs, the worship of the stars, was supplanted by the doctrines of Mohammedanism, which succeeded rapidly in establishing itself throughout Arabia.

The history of the Arabs previous to Mohammed is obscure. The earliest inhabitants are believed to have been of the Semitic race. Jews in great numbers migrated into Arabia after the destruction of Jerusalem, and, making numerous proselytes, indirectly favored the introduction of the doctrines of Mohammed. With his advent the Arabians arose and united for the purpose of extending the new creed; and under the caliphs—the successors of Mohammed—they attained great power, and founded large and powerful kingdoms in three continents. (See Caliphs.) On the fall of the caliphate of Bagdad in 1258 the decline set in, and on the expulsion of the Moors from Spain the foreign rule of the Arabs came to an end. In the 16th century Turkey subjected Hejaz and Yemen, and received

Arabia. The Hejaz thus again became subject to Turkish sway. Turkey has since extended its rule not only over Yemen, but also over the district of El-Hasa on the Persian Gulf.

**ARABIAN NIGHTS**; or, **THE THOUSAND AND ONE NIGHTS**, a celebrated collection of Eastern tales, long current in the East, and supposed to have been derived by the Arabians from India, through the medium of Persia. They were first introduced into Europe in the beginning of the 18th century by means of the French translation of Antoine Galland. Of some of them no original MS. is known to exist; they were taken down by Galland from the oral communication of a Syrian friend. The story which connects the tales of the Thousand and One Nights is as follows: The Sultan Shahriyar, exasperated by the faithlessness of his bride, made a law that every one of his future wives should be put to death the morning after marriage. At length one of them, Shahrazad, the generous daughter of the grand-vizier, succeeded in abolishing the cruel custom. By the charm of her stories the fair narrator induced the sultan to defer her execution every day till the dawn of another, by breaking



Vegetation extends to 14,200 feet. which marks the snow-line. According to tradition Mount Ararat was the resting-place of the ark when the waters of the flood abated.

**ARBITRATION**, the process by which a dispute over property, or other dispute, is settled without recourse to law, by judges selected and agreed upon by the disputants. The history of arbitration is quite old, and this method of settling disputes is really older than legal forms which are an outgrowth of it. In mediæval times international disputes were arbitrated by the pope of Rome, and the vatican still is regarded, by Roman Catholic powers, as a permanent court of arbitration. Among the numerous cases more recently decided by arbitration are those of the Alabama claims (1871), of the Samoan dispute between Great Britain, Germany, and the United States in 1889, of the Delagoa Bay dispute and the Bering Sea dispute in 1892, and of the Alaskan boundary dispute in 1897.

**ARBOR DAY**, a holiday, general in the United States, used for the planting of trees by school children. The day usually falls in early May. Its purpose is the encouragement of the idea of reforesting the country.

**AR'BORICULTURE** includes the culture of trees and shrubs, as well as all that pertains to the preparation of the soil, the sowing of the seeds, and the treatment of the plants in their young state, the preparation of the land previous to their final transplantation, their just adaptation to soil and situation, their relative growth and progress to maturity, their management during growth, and the proper season and period for felling them.

**ARBOR VITÆ**, the name of several coniferous trees allied to the cypress, with flattened branchlets, and small imbricated or scale-like leaves. The common Arbor Vitæ is a native of North America, where it grows to the height of 40 or 50 feet. The young twigs have an agreeable balsamic smell. The Chinese Arbor Vitæ, common in Britain, yields a resin which was formerly thought to have medicinal virtues.

**AR'BUTUS**, a genus of plants belonging to the Ericacæ, or heath order, and comprising a number of small trees and shrubs, natives chiefly of Europe and N. America.

**ARC**, a portion of a curve line, especially of a circle. It is by means of circular arcs that all angles are measured. —Electric or Voltaic arc, the luminous arch of intense brightness and excessively high temperature which is formed by an electric current in crossing over the interval of space between the carbon points of an electric lamp. See Arc-light.

**ARC**, Jeanne d'. See Joan of Arc.

**ARCADE**, a series of arches supported on piers or pillars, used generally as a screen and support of a roof, or of the wall of a building, and having beneath the covered part an ambulatory as round a cloister, or a foot-path with shops or dwellings, as frequently seen in old Italian towns. Sometimes a porch or other prominent part of an

important building is treated with arcades, as in the illustration.

**ARCA'DIA**, the central and most mountainous portion of the Peloponnesus, the inhabitants of which in ancient



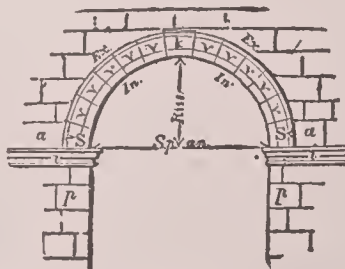
Arcade.



Arcade.

times were celebrated for simplicity of character and manners. Their occupation was almost entirely pastoral, and thus the country came to be regarded as typical of rural simplicity and happiness. At the present day Arcadia forms a nomarchy of the Kingdom of Greece. Area, 2028 sq. miles; pop. 148,600.

**ARCH**, a structure composed of separate pieces, such as stones or bricks,



Parts of Arch.

a, Abutments. i, Impost. p, Piers.  
v, Voussoirs or arch-stones. k, Keystone.  
s, Springers. in, Intrados. ex, Extrados.

having the shape of truncated wedges, arranged on a curved line, so as to retain their position by mutual pressure.

**ARCHÆAN** (är-kē'an) **ROCKS**, the oldest rocks of the earth's crust, crystalline in character, and embracing granite, syenite, gneiss, mica-schist, etc., all devoid of fossil remains. These rocks underlie and are distinctly separate from the stratified and fossiliferous formations, which indeed have chiefly taken origin from them.

**ARCHÆOL'OGY**, the science which takes cognizance of the history of nations and peoples as evinced by the remains, architectural, implemental, or otherwise, which belong to the earlier epoch of their existence. In a more extended

sense the term embraces every branch of knowledge which bears on the origin, religion, laws, language, science, arts, and literature of ancient peoples. It is to a great extent synonymous with prehistoric annals, as a large if not the principal part of its field of study extends over those periods in the history of the human race in regard to which we possess almost no information derivable from written records. Archaeology divides the primeval period of the human race, more especially as exhibited by remains found in Europe, into the stone, the bronze, and the iron age, these names being given in accordance with the materials employed for weapons, implements, etc., during the particular period. The stone age has been subdivided into the palæolithic and neolithic, the former being that older period, in which the stone implements were not polished as they are in the latter and more recent period. The bronze age, which admits of a similar subdivision, is that in which implements were of copper or bronze. In this age the dead were burned and their ashes deposited in urns or stone chests, covered with conical mounds of earth or cairns of stones. Gold and amber ornaments appear in this age. The iron age is that in which implements, etc., of iron begin to appear, although stone and bronze implements are found along with them. The word age in this sense (as explained under Age) simply denotes the stage at which a people has arrived. The phrase stone age, therefore, merely marks the period before the use of bronze, the bronze age that before the employment of iron, among any specific people.

**ARCHANGEL** (ärk-än'jel), an angel of superior or of the highest rank. The only archangel mentioned by name in Scripture is Michael in the Epistle of Jude.

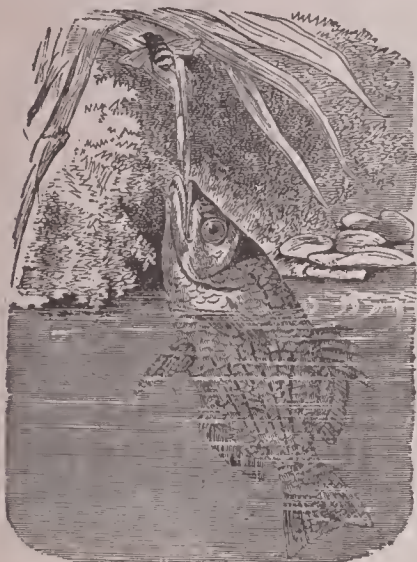
**ARCHANGEL** (ärk-än'jel), a seaport, capital of the Russian government of same name, on the right bank of the northern Dwina, about 20 miles above its mouth in the White Sea. The port is closed for six months by ice. Archangel, founded in 1584, was long the only port which Russia possessed. Pop. 19,540.—The province has an area of 331,490 sq. miles; pop. 311,673.

**ARCHBISHOP** (ärch-), a chief bishop, or bishop over other bishops; a metropolitan prelate. The establishment of this dignity is to be traced up to an early period of Christianity, when the bishops and inferior clergy met in the capitals to deliberate on spiritual affairs, and the bishop of the city where the meeting was held presided. In England there are two (Protestant) archbishops—those of Canterbury and York; the former styled Primate of all England, the latter Primate of England. The Archbishop of Canterbury is the first peer of the realm, having precedence before all great officers of the crown and all dukes not of royal birth. He crowns the sovereign, and when he is invested with his archbishopric he is said to be enthroned. He can grant special licenses to marry at any time or place, and can confer degrees otherwise to be obtained only from the universities.



**ARCHDEACON** (ärch-), an ecclesiastical dignitary next in rank below a bishop, having a certain jurisdiction over a part of the diocese. From two to four archdeacons are appointed by the bishops, under whom they perform their duties, and they hold courts which decide cases subject to an appeal to the bishop.

**ARCHER-FISH**, a name given to a scaly-finned fish, about 6 inches long, inhabiting the seas around Java, which



Archer-fish.

has the faculty of shooting drops of water to the distance of 3 or 4 feet at insects, thereby causing them to fall into the water, when it seizes and devours them. The soft, and even the spiny portion of their dorsal fins are so covered with scales as to be scarcely distinguishable from the rest of the body.

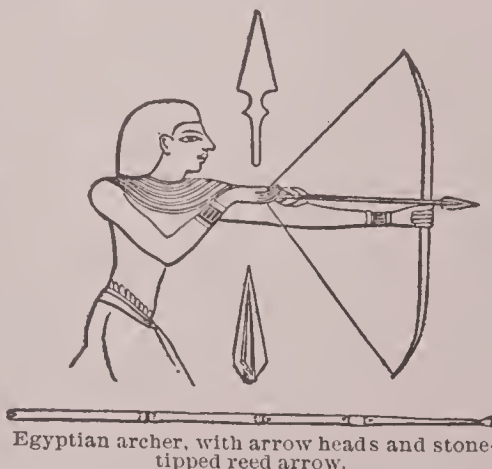
**ARCH'ERY**, the art of shooting with a bow and arrow. The use of these weapons in war and the chase dates from the earliest antiquity. Ishmael, we learn from Gen. xxi., "became an archer."



Assyrian archer.

Cressy, Poitiers, and Agincourt, gained against apparently overwhelming odds, may be ascribed to the bowmen. Archery disappeared gradually as firearms came into use, and as an instrument of war or the chase the bow is now confined to the most savage tribes of both hemispheres. But, though the bow has been long abandoned among civilized nations as a military weapon, it is still cherished as an instrument of healthful recreation, encouraged by archery clubs or societies.

**ARCHIMEDES** (är-ki-mä'dēz), a celebrated ancient Greek physicist and geometrician, born at Syracuse, in Sicily, about 287 B.C. He devoted himself entirely to science, and enriched mathematics with discoveries of the highest importance, upon which the moderns have founded their admeasurements of curvilinear surface and solids. Archimedes is the only one among the ancients who has left us anything satisfactory on the theory of mechanics and on hydrostatics. He first taught the hydrostatic principle to which his name is attached, "that a body immersed in a fluid loses as much in weight as the weight of an equal volume of the fluid," and determined by means of it that an artist had fraudulently added too much alloy to a crown which King Hiero had ordered to be made of pure gold. He discovered the solution of this problem while bathing; and it is said to have caused him so much joy that he hastened home from the bath undressed, and crying out, *Eurēka! Eurēka!* "I have found it, I have found it!" Practical mechanics also received a great deal of attention from Archimedes, who boasted that if he had a fulcrum or standpoint he could move the world. He is the inventor of the compound pulley, probably of the endless screw, the archimedean screw, etc. During the siege of Syracuse by the Romans he is said to have constructed many wonderful machines with which he repelled their



Egyptian archer, with arrow heads and stone-tipped reed arrow.

The Egyptians, Assyrians, Persians, Parthians, excelled in the use of the bow; and, while the Greeks and Romans themselves made little use of it, they employed foreign archers as mercenaries. Coming to much more recent times, we find the Swiss famous as archers, but they generally used the arbalist or cross-bow, and were no match for their English rivals, who preferred the long-bow. (See Bow.) The English victories of

attacks, and he is stated to have set on fire their fleet by burning-glasses! At the moment when the Romans gained possession of the city by assault (212 B.C.) tradition relates that Archimedes was slain while sitting in the market-place contemplating some mathematical figures which he had drawn in the sand.

**ARCHIPELAGO**, a term originally applied to the Ægean, the sea lying be-

tween Greece and Asia Minor, then to the numerous islands situated therein, and latterly to any cluster of islands.

**ARCHITECTURE**, in a general sense, is the art of designing and constructing houses, bridges, and other buildings for the purposes of civil life; or, in a more limited but very common sense, that branch of the fine arts which has for its object the production of edifices not only convenient for their special purpose, but characterized by unity, beauty, and often grandeur.—The first habitations of man were such as nature afforded, or cost little labor to the occupant—caves, huts, and tents. But as soon as men rose in civilization and formed settled societies they began to build more commodious and comfortable habitations. The Egyptians are the most ancient nation known to us among whom architecture had attained the character of a fine art. Other ancient peoples among whom it had made great progress were the Babylonians, whose most celebrated buildings were temples, palaces, and hanging-gardens; the Assyrians, whose capital, Nineveh, was rich in splendid buildings; the Phœnicians, whose cities, Sidon, Tyre, etc., were adorned with equal magnificence; and the Israelites, whose temple was a wonder of architecture. But comparatively few architectural monuments of these latter nations have remained till our day.

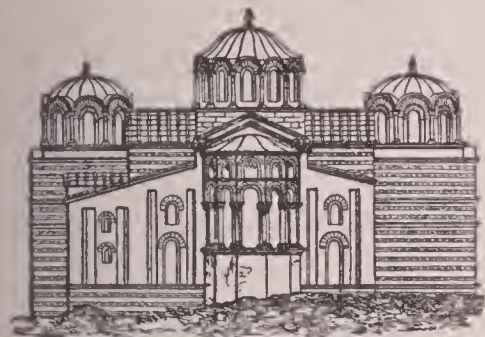
This is not the case with the architecture of Egypt, however, of which we possess ample remains in the shape of pyramids, temples, sepulchers, obelisks, etc. Egyptian chronology is far from certain, but the greatest of the architectural monuments of the country, the pyramids of Ghizeh, are at least as old as 2800 or 2700 B.C.

The earliest architectural remains of Greece are of unknown antiquity, and consist of massive walls built of huge blocks of stone. In historic times the Greeks developed an architecture of noble simplicity and dignity. This style is of modern origin compared with that of Egypt, and the earliest remains give indications that it was in part derived from the Egyptian. It is considered to have attained its greatest perfection in the age of Pericles, or about 460–430 B.C. The great masters of this period were Phidias, Ictinus, Callicrates, etc. All the extant buildings are more or less in ruins. The most remarkable public edifices of the Greeks were temples, of which the most famous is the Parthenon at Athens. Their theaters were semicircular on one side and square on the other, the semicircular part being usually excavated in the side of some convenient hill. This part, the auditorium, was filled with concentric seats, and might be capable of containing 20,000 spectators. A number exist in Greece, Sicily, and Asia Minor, and elsewhere. The Romans became acquainted with the architecture of the Greeks soon after 200 B.C., but it was not till about two centuries later that the architecture of Rome attained (under Augustus) its greatest perfection. Among the great works now erected were temples, aqueducts, amphitheaters, magnificent villas, triumphal arches,



## ARC-LIGHT

monumental pillars, etc. The amphitheater differed from the theater in being a completely circular or rather elliptical building, filled on all sides with ascending seats for spectators and leaving only the central space, called the arena, for the combatants and



Byzantine—Church of Our Lady, at Constantinople.

public shows. The Colosseum is a stupendous structure of this kind. The thermæ, or baths, were vast structures in which multitudes of people could bathe at once. Magnificent tombs were often built by the wealthy. Remains of private residences are numerous, and the excavations at Pompeii in particular have thrown great light on the internal arrangements of the Roman dwelling-house.

In Constantinople, after its virtual separation from the Western Empire, arose a style of art and architecture which was practiced by the Greek Church during the whole of the middle ages. This is called the Byzantine style. The church of St. Sophia at Constantinople, built by Justinian (reigned 527-565), offers the most typical specimen of the style, of which the fundamental principle was an application of the Roman arch, the dome being the most striking feature of the building. In the most typical examples the dome or cupola rests on four pendentives.

After the dismemberment of the Roman Empire the beautiful works of ancient architecture were almost entirely destroyed by the Goths, Vandals, and other barbarians in Italy, Greece, Asia, Spain, and Africa; or what was spared by them was ruined by the fanaticism of the Christians. A new style of architecture now arose, two forms of which

man Romanesque flourished, especially in Normandy and England, from the 11th to the middle of the 13th century. The semicircular arch is the most characteristic feature of this style. With the Lombard Romanesque were combined Byzantine features, and buildings in the pure Byzantine style were also erected in Italy, as the Church of St. Mark at Venice.

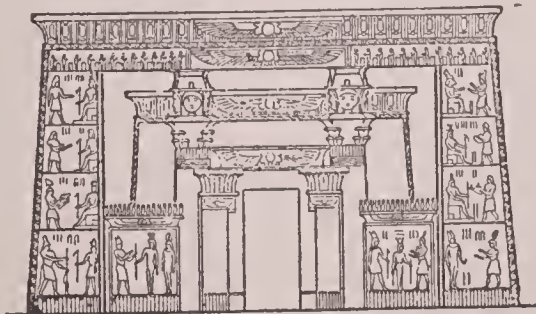
The Germans were unacquainted with architecture until the time of Charlemagne (or Charles the Great, 742-814). He introduced into Germany the Byzantine and Romanesque styles. Afterward the Moorish or Arabian style had some influence upon that of the western nations, and thus originated the mixed style which maintained itself till the middle of the 13th century.

The rise of the Renaissance style in Italy is the greatest event in the history of architecture after the introduction of the Gothic style. The Gothic style had been introduced into the country



Grecian Doric—Temple of Jupiter at Olympia.

and extensively employed, but had never been thoroughly naturalized. The Renaissance is a revival of the classic style based on the study of the ancient models; and, having practically commenced in Florence about the beginning of the 15th century, it soon spread with great rapidity over Italy and the greater part of Europe. The most illustrious architects of this early period of the style were Brunelleschi, who built at Florence the dome of the cathedral, the Pitti Palace, etc., besides many edifices at Milan, Pisa, Pesaro, and Mantua; Alberti, who wrote an important work on architecture, and



Egyptian—Front of Temple of Isis at Philæ.

the Lombard and the Norman Romanesque, form important phases of art. The Lombard prevailed in north Italy and south Germany from the 8th or 9th to the 13th century (though the Lombard rule came to an end in 774); the Nor-

erected many admired churches; Bramante, who began the building of St. Peter's, Rome, and Michael Angelo, who erected its magnificent dome. On St. Peter's were also employed Raphael, Peruzzi and San Gallo. The noblest

## ARCTIC

building in this style of architecture in Britain is St. Paul's, London, the work of Sir Christopher Wren.

Within the past 17 years American architects (notably W. L. B. Jenney, of Chicago) invented a new method of



Romanesque—Cathedral of Worms.

construction for large private and public buildings, called "steel construction." This consists of erecting a skeleton of steel beams and joists, all securely riveted together, forming a great united steel cage, around which are placed solid casings of fire-proof tiles. This fire-proof skeleton is then enclosed within walls and the interior finish added. Steel buildings of this kind are fire-proof, tornado-proof, and earthquake-proof.

ARC-LIGHT, that species of the electric light in which the illuminating source is the current of electricity passing between two sticks of carbon kept



Arc-light: carbons magnified.

a short distance apart, one of them being in connection with the positive, the other with the negative terminal of a battery or dynamo.

AR'COT, two districts and a town of India, within the Presidency of Madras. North Arcot is an inland district with an area of 7256 sq. miles. The country is partly flat and partly mountainous, where intersected by the Eastern Ghâts. Pop. 1,817,814.—South Arcot lies on the Bay of Bengal, and has two seaports, Cuddalor and Porto Novo. Pop. 1,814,738.—The town Arcot is in North Arcot, on the Palar, about 70 miles w. by s. of Madras. Pop. 12,000.

ARCTIC (ärk'tik), an epithet given to the north pole from the proximity of the constellation of the Bear, in Greek called arktos. The Arctic Circle is an imaginary circle on the globe, parallel



to the equator, and 23° 28' distant from the north pole. This and its opposite, the Antarctic, are called the two polar circles.

**ARCTIC OCEAN**, that part of the water surface of the earth which surrounds the north pole, and washes the northern shores of Europe, Asia, and America; its southern boundary roughly coinciding with the Arctic Circle (lat. 66° 32' n.). It incloses many large islands, and contains large bays and gulfs which deeply indent the northern shores of the three continents. Its great characteristic is ice, which is nearly constant everywhere.

**ARCTIC REGIONS**, the regions round the north pole, and extending from the pole on all sides to the Arctic Circle in lat. 66° 32' n. The Arctic or North Polar Circle just touches the northern headlands of Iceland, cuts off the southern and narrowest portion of Greenland, crosses Fox's Strait north of Hudson's Bay, whence it goes over the American continent to Bering's Strait. Thence it runs to Obdorsk at the mouth of the Obi, then crossing northern Russia, the White Sea, and the Scandinavian Peninsula, returns to Iceland. Though much skill and heroism have been developed in the exploration of this portion of the earth, there is still an area round the pole estimated at 2,500,000 sq. miles, which is a blank to geographers. Many have adopted the belief in the existence of an open polar sea about the north pole. But this belief is not supported by any positive evidence. Valuable minerals, fossils, etc., have been discovered within the Arctic regions. In the archipelago north of the American continent excellent coal frequently occurs. The mineral cryolite is mined in Greenland. Fossil ivory is obtained in islands at the mouth of the Lena. In Scandinavia, parts of Siberia, and north-west America, the forest region extends within the Arctic Circle. The most characteristic of the natives of the Arctic regions are the Eskimos. The most notable animals are the white-bear, the musk-ox, the reindeer, and the whale-bone whale. Fur-bearing animals are numerous. The most intense cold ever registered in those regions was 74° below zero Fahr. The aurora borealis is a brilliant phenomenon of Arctic nights. See Polar Exploration.

**ARCTURUS**, a fixed star of the first magnitude in the constellation of Boötes, and thought by some to be the nearest to our system of any of the fixed stars. It is one of the stars observed to have a motion of its own, and is a noticeable object in the northern heavens.

**ARDECHE** (är-dāsh'), a department in the south of France (Languedoc), on the west side of the Rhone, taking its name from the river Ardèche, which rises within it, and falls into the Rhone after a course of 46 miles; area, 2134 sq. miles. It is generally of a mountainous character, and contains the culminating point of the Cevennes. Silk and wine are produced. Annonay is the principal town, but Privas is the capital. Pop. 353,564.

**ARDENNES** (är-den'), a frontier department in the northeast of France; area, 2020 sq. miles, partly consisting

of the Forest of Ardennes. Chief towns, Mézières (the capital), Rocroi, and Sedan. Pop. 315,589.

**AREA**, the superficial content of any figure or space, the quantity of surface it contains in terms of any unit. See Mensuration.

**ARENA**, the inclosed space in the central part of the Roman amphitheaters, in which took place the combats of gladiators or wild beasts. It was usually covered with sand or sawdust to prevent the gladiators from slipping, and to absorb the blood.

**AREOLAR TISSUE**, an assemblage of fibers and laminae pervading every part of the animal structure, and connected with each other so as to form innumerable small cavities, by means of which the various organs and parts of organs are connected together; called also Cellular Tissue and Connective Tissue.—In botany the term is sometimes applied to the non-vascular substance, composed entirely of untransformed cells, which forms the soft substance of plants.

**AREOMETER**, an instrument for measuring the specific gravity of liquids; a hydrometer (which see).

**AREQUIPA** (ä-rä-kē'pā), a city of Peru, 200 miles south of Cuzco, situated in a fertile valley, 7850 feet above sea-level. Pop. 30,000.

**ARES** (ä-réz). See Mars.

**AREZZO** (ä-ret'sō), a city of central Italy, capital of a province of the same name in Tuscany, near the confluence of the Chiana with the Arno. It is the birthplace of Mæcenas, Petrarch, Pietro Aretino, Redi, and Vasari. Pop. 44,350.—The province of Arezzo contains 1276 sq. miles and 272,359 inhabitants.

**AR'GAND LAMP**, a lamp named after its inventor, Aimé Argand, a Swiss chemist and physician (born 1755, died 1803), the distinctive feature of which is a burner forming a ring or hollow cylinder covered by a chimney, so that the flame receives a current of air both on the inside and on the outside.

**ARGEMONE** (är-jem'o-nē), a small genus of ornamental American plants of the poppy order. From the seeds is obtained an oil very useful to painters.

**AR'GENTINE REPUBLIC**, formerly called the United Provinces of La Plata, a vast country of South America, the extreme length of which is 2300 miles, and the average breadth a little over 500 miles, the total area exceeding 1,200,000 sq. miles. It is bounded on the n. by Bolivia; on the e. by Paraguay, Brazil, Uruguay, and the Atlantic; on the s. by the Antarctic Ocean; and on the w. by the Andes. It comprises four great natural divisions: (1) the Andine region, containing the provinces of Mendoza, San Jaun, Rioja, Catamarca, Tucuman, Salta, and Jujuy; (2) the Pampas, containing the provinces of Santiago, Santa Fé, Cordova, San Luis, and Buenos Ayres; with the territories Formosa, Pampa, and Chaco; (3) the Argentine Mesopotamia, between the rivers Parana and Uruguay, containing the provinces of Entre Rios and Corrientes, and the territory Misiones; (4) Patagonia, including the eastern half of Tierra del Fuego. With the exception of the n.w., where lateral branches of

the Andes run into the plain for 150 or 200 miles, and the province of Entre Rios, which is hilly, the characteristic feature of the country is the great monotonous and level plains called "pampas." In the north these plains are partly forest-covered, but all the central and southern parts present vast treeless tracts, which afford pasture to immense herds of horses, oxen, and sheep, and are varied in some places by brackish swamps, in others by salt steppes. The great water-course of the country is the Parana, having a length of fully 2000 miles from its source in the mountains of Goyaz, Brazil, to its junction with the Uruguay, where begins the estuary of La Plata. The Parana is formed by the union of the Upper Parane and Paraguay rivers, near the n.e. corner of the state. Important tributaries are the Pilcomayo, the Vermejo, and the Salado. The Parana, Paraguay, and Uruguay are valuable for internal navigation. Many of the streams which tend eastward terminate in marshes and salt lakes, some of which are rather extensive. Not connected with the La Plata system are the Colorado and the Rio Negro, the latter formerly the southern boundary of the state, separating it from Patagonia. The source of the Negro is Lake Nahuel Huapi, in Patagonia (area, 1200 sq. miles), in the midst of magnificent scenery. The level portions of the country are mostly of tertiary formation, and the river and coast regions consist mainly of alluvial soil of great fertility. In the pampas clay have been found the fossil remains of extinct Mammalia, some of them of colossal size.

European grains and fruits, including the vine, have been successfully introduced, and are cultivated to some extent in most parts of the republic, but the great wealth of the state lies in its countless herds of cattle and horses and flocks of sheep, which are pastured on the pampas, and which multiply there very rapidly. Gold, silver, nickel, copper, tin, lead, and iron, besides marble, jasper, precious stones, and bitumen, are found in the mountainous districts of the n.w., while petroleum wells have been discovered on the Rio Vermejo; but the development of this mineral wealth has hitherto been greatly retarded by the want of proper means of transport. As a whole there are not extensive forests in the state except in the region of the Gran Chaco (which extends also into Bolivia), where there is known to be 60,000 square miles of timber. Thousands of square miles are covered with thistles, which grow to a great height in their season. Cacti also form great thickets. Peach and apple trees are abundant in some districts. The native fauna includes the puma, the jaguar, the tapir, the llama, the alpaca, the vicuña, armadillos, the rhea or nandu, a species of ostrich, etc. The climate is agreeable and healthful, 97° being about the highest temperature experienced. The rainfall is very scanty in some districts, and is nowhere very large.

The river La Plata was discovered in 1512 by the Spanish navigator Juan



Diaz de Solis, and the La Plata territory had been brought into the possession of Spain by the end of the 16th century. In 1810 the territory cast off the Spanish rule, and in 1816 the independence of the United States of the Rio de la Plata was formally declared, but it was long before a settled government was established. The present constitution dates from 1853, being subsequently modified. The executive power is vested in a president—elected by the representatives of the fourteen provinces for a term of six years. A national congress of two chambers—a senate and a house of deputies—wields the legislative authority, and the republic is making rapid advances in social and political life. The national revenue for 1901 amounted to about \$65,000,000, while the expenditure amounted to fully \$70,000,000; the public debt is about \$390,000,000. There are about 11,000 miles of railway opened. The external commerce is important, the chief exports being wool, skins and hides, live animals, mutton, tallow, bones, corn, and flax. The imports are chiefly manufactured goods. The trade is largely with Britain and France, and is increasing rapidly, the exports having advanced from \$45,000,000 in 1876 to \$150,000,000 in 1901. The imports are over \$100,000,000 annually. Buenos Ayres is the capital. Other towns are Cordova, Rosario, La Plata, Tucuman, Mendoza, and Corrientes. The population of the republic, which is rapidly increasing by immigration, was, in 1895, 4,092,990; of the capital, 690,000.

**AR'GONAUT**, a molluscous animal belonging to the dibranchiate or two-gilled cuttlefishes, distinguished by the females possessing a single-chambered external shell, not organically connected



Argonaut.

with the body of the animal. The males have no shell and are of much smaller size than the females. The shell is fragile, translucent, and boat-like in shape; it serves as the receptacle of the ova or eggs of the female, which sits in it with the respiratory tube or "funnel" turned toward the carina or "keel." This famed mollusc swims only by ejecting water from its funnel, and it can crawl in a reversed position, carrying its shell over its back like a snail. The argonaut, or paper-*nautilus*, must be carefully distinguished from the pearly-*nautilus* or *nautilus* proper.

**ARGONAUTS**, in the legendary history of Greece, those heroes who performed a hazardous voyage to Colchis, a far-distant country at the eastern

extremity of the Euxine (Black Sea), with Jason in the ship *Argo*, for the purpose of securing a golden fleece, which was preserved suspended upon a tree, and under the guardianship of a sleepless dragon. By the aid of Medea, daughter of the king of Colchis, Jason was enabled to seize the fleece, and, after many strange adventures, to reach his home at Iolcos in Thessaly. Among the Argonauts were Hercules, Castor and Pollux, Orpheus and Theseus.

**ARGO-NAVIS**, the southern constellation of the Ship, containing 9 clusters, 3 nebulae, 13 double and 540 single stars, of which about 64 are visible.

**AR'GOS**, a town of Greece, in the northeast of the Peloponnesus, between the gulfs of Ægina and Nauplia or Argos. This town and the surrounding territory of Argolis were famous from the legendary period of Greek history onward, the territory containing, besides Argos, Mycenæ, where Agamemnon ruled, with a kind of sovereignty, over all the Peloponnesus. Argolis forms a nomarchy of the Kingdom of Greece; pop. 80,695. The capital is Nauplia.

**AR'GUMENT**, a term sometimes used as synonymous with the subject of a discourse, but more frequently appropriated to any kind of method employed for the purpose of confuting or at least silencing an opponent.

**AR'GUS**, in Greek mythology, a fabulous being, said to have had a hundred eyes, placed by Juno to guard Io. Hence "argus-eyed," applied to one who is exceedingly watchful.

**ARGUS-PHEASANT**, a large, beautiful, and very singular species of pheasant, found native in the southeast of Asia, more especially in Sumatra and some of the other islands. The males measure from 5 to 6 feet from the tip of the beak to the extremity of the tail, which has two greatly elongated central feathers. The plumage is exceedingly beautiful, the secondary quills of the wings, which are longer than the primary feathers, being each adorned with a series of ocellated or eye-like spots (whence the name—see Argus) of brilliant metallic hues. The general body plumage is brown.

**ARGYLE**, or **ARGYLL** (är-gil'), an extensive county in the southwest of the Highlands of Scotland, consisting partly of mainland and partly of islands belonging to the Hebrides group. On the land side the mainland is bounded north by Inverness; east by Perth and Dumbarton; elsewhere surrounded by the Firth of Clyde and its connections and the sea; area, 3255 square miles (or over 2,000,000 acres), of which the islands comprise about 1000 square miles. The county is exceedingly mountainous, the chief summits being Bidcan-nam-Bian (3766 ft.), Ben Laoigh (3708 ft.), Ben Cruachan (3611 ft.), Benmore, in Mull (3185 ft.), the Paps of Jura (2565 ft.), and Ben Arthur or the Cobbler (2891 ft.). There are several lakes, the principal of which is Loch Awe. The chief minerals are slate, marble, limestone, and granite. County town, Inveraray; others, Campbeltown, Oban, and Dunoon. Pop. (1901), 73,665.

**ARGYLL, CAMPBELLS OF**, a historic Scottish family, raised to the peerage in the person of Sir Duncan Campbell of Lochow, in 1445. The more eminent members are: (1) Archibald, 2d Earl, killed at the battle of Flodden, 1513.—Archibald, 5th Earl, who was the means of averting a collision between the Reformers and the French troops in 1559; died 1575.—Archibald, 8th Earl and Marquis, born 1598; created a marquis by Charles I. At the Restoration he was committed to the Tower, and afterward sent to Scotland, where he was tried for high treason, and beheaded in 1661.—Archibald, 9th Earl, son of the preceding, was excluded from the general pardon by Cromwell in 1654; beheaded in 1685.—Archibald, 10th Earl and 1st Duke, died 1703; took an active part in the Revolution of 1688–89, which placed William and Mary on the throne.—John, 2d Duke and Duke of Greenwich, born 1678, died 1743; served under Marlborough, and assisted at the sieges of Lisle and Ghent. He was long a supporter of Walpole, but his political career was full of intrigue. He is the Duke of Argyll in Scott's *Heart of Midlothian*.—George Douglas Campbell, K.T., K.G., etc., 8th Duke (of U. Kingdom, 1892), was born in 1823. In 1852 he became lord privy seal under Lord Aberdeen, and again under Lord Palmerston in 1859; postmaster-general in 1860; secretary for India from 1868 to 1874; again lord privy seal in 1880, but retired, being unable to agree with his colleagues on their Irish policy. He died in 1900. His eldest son, the Marquis of Lorne, married the Princess Louise, daughter of Queen Victoria, in 1871. See Lorne, Marquis of.

**ARIA**, in music. See Air.

**ARIADNE** (a-ri-ad'ne), in Greek mythology, a daughter of Minos, King of Crete. She gave Theseus a clue of thread to conduct him out of the labyrinth after his defeat of the Minotaur. Theseus abandoned her on the Isle of Naxos, where she was found by Bacchus, who married her.

**ARIEGE** (ä-rē-āzh), a mountainous department of France, on the northern slopes of the Pyrenees, comprising the ancient counthip of Foix and parts of Languedoc and Gascony. Area, 1890 sq. miles; pop. 219,641.

**A'RIEL**, the name of several personages mentioned in the Old Testament; in the demonology of the later Jews a spirit [of the waters. In Shakespeare's *Tempest*, Ariel was the "tricksy spirit" whom Prospero had in his service.

**ARIES** (ä'ri-ēz), the Ram, a northern constellation of 156 stars, of which fifty are visible. It is the first of the twelve signs in the zodiac, which the sun enters at the vernal equinox, about the 21st of March. The first point in Aries is that where the equator cuts the ecliptic in the ascending node, and from which the right ascensions of heavenly bodies are reckoned on the equator, and their longitudes upon the ecliptic. Owing to the precession of the equinoxes the sign Aries no longer corresponds with the constellation Aries, which it did 2000 years ago.

**AR'IL**, **ARIL'LUS**, in some plants, as in the nutmeg, an extra covering of



the seed, outside of the true seed-coats, proceeding from the placenta, partially investing the seed, and falling off spontaneously. It is either succulent or cartilaginous, colored, elastic, rough, or knotted. In the nutmeg it is known as mace.

**ARISTARCHUS** (ar-is-tär'kus) an ancient Greek astronomer belonging to Samos, flourished between 280 and 264 B.C., and first asserted the revolution of the earth about the sun; also regarded as the inventor of the sun-dial.

**ARISTIDES** (ar-is-tī'dēz), a statesman of ancient Greece, for his strict integrity surnamed the Just. He was one of the ten generals of the Athenians when they fought with the Persians at Marathon, B.C. 490. Next year he was eponymous archon, and in this office enjoyed such popularity that he excited the jealousy of Themistocles, who succeeded in procuring his banishment by the ostracism (about 483). Three years after, when Xerxes invaded Greece with a large army, the Athenians hastened to recall him, and Themistocles now admitted him to his confidence and councils. In the battle of Plataea (479) he commanded the Athenians, and had a great share in gaining the victory. To defray the expenses of the Persian war he persuaded the Greeks to impose a tax, which should be paid into the hands of an officer appointed by the states collectively, and deposited at Delos. The confidence which was felt in his integrity appeared in their intrusting him with the office of apportioning the contribution. He died at an advanced age about B.C. 468, so poor that he was buried at the public expense.

**ARISTOCRACY**, a form of government by which the wealthy and noble, or any small privileged class, rules over the rest of the citizens; now mostly applied to the nobility or chief persons in a state.

**ARISTOPHANES** (-tof'a-nēz), the greatest comic poet of ancient Greece, born at Athens probably about the year 444 B.C.; died not later than B.C. 380. Little is known of his life.

**ARISTOTLE**, a distinguished philosopher and naturalist of ancient Greece, the founder of the Peripatetic school of philosophy, was born in 384 B.C. at Stagira, in Macedonia, died at Chalcis, B.C. 322. His father, Nicomachus, was physician to Amyntas II., king of Macedonia, and claimed to be descended from Æsculapius. Aristotle had lost his parents before he came, at about the age of seventeen, to Athens to study in the school of Plato. With that philosopher he remained for twenty years, became preeminent among his pupils, and was known as the "Intellect of the School." Upon the death of Plato, 348 B.C., he took up his residence at Atarneus, in Mysia, on the invitation of his former pupil Hermeias, the ruler of that city, on whose assassination by the Persians, 343 B.C., he fled to Mitylene with his wife Pythia, the niece of Hermeias. During his residence at Mitylene he received an invitation from Philip of Macedon to superintend the education of his son Alexander, then in his fourteenth year. This relationship between the great philosopher and the

future conqueror continued for five or six years, during which the prince was instructed in grammar, rhetoric, poetry, logic, ethics, and politics, and in those branches of physics which had even then made some considerable progress. On Alexander succeeding to the throne Aristotle continued to live with him as his friend and counselor till he set out on his Asiatic campaign (334 B.C.). He returned to Athens and established his school in the Lyceum, a gymnasium attached to the temple of Apollo Lyceus, which was assigned to him by the state. He delivered his lectures in the wooded walks of the Lyceum while walking up and down with his pupils. From the action itself, or more probably from the name of the walks (peripatoi), his school was called Peripatetic. Pupils gathered to him from all parts of Greece, and his school became by far the most popular in Athens. It was during the time of his teaching at Athens that Aristotle is believed to have composed the great bulk of his works. On the death of Alexander a revolution occurred in Athens hostile to the Macedonian interests with which Aristotle was identified. He therefore retired to Chalcis, where he soon after died. According to Strabo he bequeathed all his works to Theophrastus, who, with other disciples of Aristotle, amended and continued them. They afterward passed through various hands, till, about 50 B.C., Andronicus of Rhodes put the various fragments together and classified them according to a systematic arrangement. Many of the books bearing his name are spurious, others are of doubtful genuineness.

**ARITHMETIC** is primarily the science of numbers. As opposed to algebra it is the practical part of the science. Although the processes of arithmetical operations are often highly complicated, they all resolve themselves into the repetition of four primary operations: addition, subtraction, multiplication, and division. Of these the two latter are only complex forms of the two former, and subtraction again is merely a reversal of the process of addition. Little or nothing is known as to the origin and invention of arithmetic. Some elementary conception of it is in all probability coeval with the first dawn of human intelligence. In consequence of their rude methods of numeration, the science made but small advance among the ancient Egyptians, Greeks, and Romans, and it was not until the introduction of the decimal scale of notation and the Arabic, or rather Indian, numerals into Europe that any great progress can be traced. In this scale of notation every number is expressed by means of the ten digits, 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, by giving each digit a local as well as its proper or natural value. The value of every digit increases in a tenfold proportion from the right toward the left; the distance of any figure from the right indicating the power of 10, and the digit itself the number of those powers intended to be expressed: thus  $3464 = 3000 + 400 + 60 + 4 = 3 \times 10^3 + 4 \times 10^2 + 6 \times 10 + 4$ . The earliest arithmetical signs appear to have been hieroglyphical, but

the Egyptian hieroglyphics were too diffuse to be of any arithmetical value. The units were successive strokes to the number required, the ten an open circle, the hundred a curled palm-leaf, the thousand a lotus flower, ten thousand a bent finger. The letters of the alphabet afforded a convenient mode of representing figures, and were used accordingly by the Chaldeans, Hebrews, and Greeks. The first nine letters of the Hebrew alphabet represented the units, the second nine tens, the remaining four together with five repeated with additional marks, hundreds; the same succession of letters with added points was repeated for thousands, tens of thousands, and hundreds of thousands. The Greeks followed the same system up to tens of thousands. They wrote the different classes of numbers in succession as we do, and they transferred operations performed on units to numbers in higher places; but the use of different signs for the different ranks clearly shows a want of full perception of the value of place as such. They adopted the letter M as a sign for 10,000 and by combining this mark with their other numerals they could note numbers as high as 100,000,000. The Roman numerals which are still used in marking dates or numbering chapters were almost useless for purposes of computation. From one to four were represented by vertical strokes I, II, III, IIII, five by V, ten by X, fifty by L, one hundred by C, afterward D, five hundred by D, a thousand by M. These signs were derived from each other according to particular rules, thus V was the half of X, A being also used; L was likewise the half of C. M was artistically written M and cIo, and Io, afterward D, became five hundred. ccI represented 500, ccIo 10,000, Io 50,000, cccIo 100,000. They were also compounded by addition and subtraction, thus IV stood for four, VI for six, XXX for thirty, XL for forty, LX for sixty. Arithmetic is divided into abstract and practical; the former comprehends notation, numeration, addition, subtraction, multiplication, division, measures and multiples, fractions, powers and roots; the latter treats of the combinations and practical applications of these and the so-called rules, such as reduction, compound addition, subtraction, multiplication, and division, proportion, interest, profit and loss, etc. Another division is integral and fractional arithmetic, the former treating of integers, or whole numbers, and the latter of fractions. Decimal fractions were invented in the 16th century, and logarithms, embodying the last great advance in the science, in the 17th century.

**ARIZONA**, a territory of the United States bounded by Utah, Mexico, New Mexico, California, and Nevada, in latitudes  $31^{\circ} 20'$  and  $37^{\circ}$  n. and longitudes  $109^{\circ} 3'$  and  $114^{\circ} 54'$  w. It has an area of 113,020 sq. miles and a population (1998) of 200,000. It is believed that the country, now called Arizona, was formerly inhabited by a powerful race who built cities, constructed forts, and were civilized in a high degree. The first white men to explore this region were Marco de Nizan and his



companions, Spanish missionaries. Subsequent expeditions and settlement were discouraged by the Apaches, who have, until the present time, been a source of trouble to the white inhabitants. In 1848 Arizona, together with New Mexico, became part of the United



States, by the Gadsden purchase. On Feb. 24, 1813, it became a territory. In 1907 it was admitted with Oklahoma as the state of Oklahoma.

The territory is, in its southwestern part, of low elevation, and its northeastern portion consists of a high plateau. In the south are numerous high mountain peaks, many of them (Thomas, Ord, Bill Williams, and others) 10,000 feet high and higher. The northern table-



Marble cañon, Colorado river.

land at places is 8000 feet in altitude. The Colorado is the principal river, and its cañon reaches its most picturesque state in Arizona. The climate is mild, very dry, and very healthful, varying in temperature from excessive heat to a mean of 45°. The rainfall is from five to twenty inches yearly in various parts of the territory.

Owing to the lack of irrigation Arizona has been very backward in agriculture. The principal industries are stock-raising, alfalfa, wheat, and barley. Figs, raisin-grapes and nuts of excellent quality are grown, and cotton could be raised with adequate irrigation. The mineral resources of Arizona are probably richer than those of any other state or territory in the Union, but their development has been held back by poor and scanty transportation facilities. Copper (263,200,000 pounds in 1906), gold (\$2,747,100 in 1906), and silver (\$2,099,822 in 1906) are the chief mining products. Rich deposits of platinum, gypsum, mercury, salt, iron, nickel, tin, and precious stones abound.

Arizona has a total of 1881 miles of railway, eight national banks, and a good educational system.

ARK, the name applied in our translation of the Bible to the boat or floating edifice in which Noah resided during the flood or deluge; to the floating vessel of bulrushes in which the infant Moses was laid; and to the ark of the covenant, which was one of the most important parts of the furniture of the tabernacle, which the Israelites constructed in the wilderness, and afterwards of the temple built by Solomon at Jerusalem. A description of it is to be found in Exodus xxv., in the command given to Moses for its construction; and also in Exodus xxxvii, from which it appears it was a chest of shittim-wood, overlaid with gold within and without, two cubits and a half in length, one cubit and a half in breadth and in height—that is, according to the common estimate of the length of the cubit, three feet nine inches in length, and two feet three inches in breadth and height—the lid being formed entirely of pure gold, with a crown or raised border of pure gold round about. Within the ark was deposited the “testimony,” consisting of “the two tables of the law,” i. e., the stone tablets upon which the ten commandments were inscribed. The golden lid of the ark was called the *mercy-seat* or *propitiatory*, and above it were the *cherubims*, made of the same piece of gold with it, and between them was the place of the manifestation of the Divine presence.

ARKANSAS (ār’kan-sa), one of the South Central states, bounded on the north by Missouri, by Louisiana on the south, the Mississippi river on the east, and by the Indian Territory and Texas on the west. It has an area of 53,850 sq. miles, a population (1906) of 1,750,000, and ranks twenty-third in size among the states.

The climate is, on the whole, delightful. The annual mean rainfall varies from 50 to 63 inches, the winters are mild, with light snowfall, and the summers are long. Arkansas takes its name from the Indians found there by the first explorers, who were French. In 1685 settlements were made in the southern and eastern parts, Arkansas then being a part of the general territory of Louisiana. In 1812 it became a part of Missouri Territory, then Arkansas Territory, and in 1836 it was admitted into the Union. The state seceded from

the Union in 1861, but the people were fairly divided on the subject of secession, and with the taking of Little Rock in 1863 the confederate power failed. The state has generally voted the democratic ticket in national elections.



Although the mineral resources of Arkansas are varied they are not highly developed. The principal product is that of whetstones, the quality of which has made them famous. They are obtained from the mountains in the vicinity of Little Rock. These mountains are part of the Ozark range. The principal rivers are the Arkansas, the White, the Red, and the Black. These streams are fairly navigable, but lack of transportation facilities in general has cramped the development of the mining industry in Arkansas. The mineral products include zinc, manganese, iron, lead, and copper; marble, whet and hone stones, rock-crystal, paints, niter-earths, kaolin, granite, freestone, limestone, marls, greensand, marly limestones, grindstones, and slate. Of coal, anthracite and lignite, there are abundant supplies. A great number of mineral and thermal springs occur in various parts of the state, the most remarkable and most frequented groups lying to the south of the Arkansas in Hot Springs county. The heat of several attains 146° or 148° Fahr. There is a great variety of soil in Arkansas. Along the river “bottoms” the alluvium is dark, rich, and deep, and yields excellent crops. The chief crops cultivated are corn, wheat, cotton, and tobacco, as well as apples and other fruits. The trees and shrubs most frequently occurring are poplars, oaks, pines, sweet-gum, sycamore, black locust, ash, elm, hickory, dogwood, elder, palma-christi, black spice, pawpaw, mockernut, wild vine, etc. The fauna of Arkansas includes the buffalo, eland, red-deer, beaver, otter, hare, raccoon, wild turkey, goose and quail, as well as bears and wolves among the mountains. The climate of the lower districts is decidedly unhealthy, largely on account of the lack of wholesome water; but in the upper regions it is quite salubrious.

The material interests of the State are enjoying a high degree of prosperity. The products of the lumber and mining industries, have annually increased in volume, to meet the constantly growing demand there for



## ARKANSAS RIVER

throughout the State and in other portions of the Southwest.

There is a total of 4,532 miles of railroad in the State, owned and maintained by the St. Louis, Arkansas and Texas; Iron Mountain; Little Rock and Fort Smith, and other roads and their branches.

The school system is well managed and sustained. It is under the direction of a state superintendent and subordinate officials. In addition to the school houses distributed throughout the various school districts in the state, a Normal school is conducted at Pine Bluff, and an industrial university at Fayetteville. The curriculum of the latter embraces agriculture and mechanical courses, besides the regular classical and scientific departments. The State also maintains schools for the blind, and deaf and dumb, and has at present a total of about 1,200,000 acres of State lands of various descriptions remaining unsold.

The population by decades is as follows: 1820, 14,000; 1830, 30,000; 1840, 97,000; 1850, 209,000; 1860, 435,000; 1870, 484,000; 1880, 802,000; 1890, 1,128,000; 1908, 1,440,000. In 1820 Arkansas ranked twenty-sixth in order of population, and has since varied but little from this position, being twenty-fifth in 1900. The state ranks tenth in respect to negro population, the rate of increase for this class being greater than it is for the whites. In 1880 they numbered 210,000; in 1900, 366,000. In 1909 Little Rock, the capital, had a population of 60,000; Pine Bluff, 11,147; Fort Smith, 10,903; Hot Springs, 9,412. The state has invariably been Democratic.

**ARKANSAS CITY**, a rapidly growing city in the southern portion of Cowley county, Kansas, is situated at the junction of the Walnut and Arkansas rivers. The Atchison, Topeka and Santa Fe, Missouri Pacific, and St. Louis and San Francisco roads pass through the city and afford abundant facilities for shippers and travelers. It contains commercial and manufacturing enterprises in large number, many of the latter being operated by water power, of which an abundance is available. The city is lighted by gas and electricity, provided with water-works and is progressive. Population, 8,354.

**ARKANSAS** (är-kan'sas) **RIVER**, the second largest affluent of the Mississippi, the Missouri ranking first. It rises in central Colorado, flows through Kansas, Oklahoma and Indian Territories, and empties into the Mississippi. It is 2000 miles long and navigable for about 600 miles from its mouth.

**ARKWRIGHT**, Sir Richard, famous for his inventions in cotton-spinning, was born at Preston, in Lancashire, in 1732; died 1792. When about thirty-five years of age he gave himself up exclusively to the subject of inventions for spinning cotton. The thread spun by Hargreaves's jenny could not be used except as weft, being destitute of the firmness or hardness required in the longitudinal threads or warp. But Arkwright supplied this deficiency by the invention of the spinning-frame, which spins a vast number of threads of any degree of fineness and hardness,

leaving the operator merely to feed the machine with cotton and to join the threads when they happen to break. His invention introduced the system of spinning by rollers, the carding, or roving as it is technically termed (that is, the soft, loose strip of cotton), passing through one pair of rollers, and being received by a second pair, which are made to revolve with (as the case may be) three, four, or five times the velocity of the first pair. By this contrivance the roving is drawn out into a thread of the desired degree of tenuity and hardness. Having made several additional discoveries and improvements in the processes of carding, roving, and spinning, he took out a fresh patent for the whole in 1775, and thus completed a series of the most ingenious and complicated machinery. Notwithstanding a series of lawsuits in defense of his



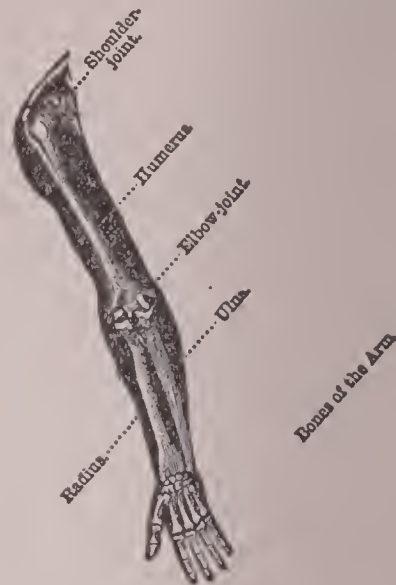
Sir Richard Arkwright.

patent rights, and the destruction of his property by mobs, he amassed a large fortune. He was knighted by George III. in 1786.

**ARLES**, a town of southern France, dep. Bouches du Rhone, 17 miles southeast of Nismes. It was an important town at the time of Caesar's invasion, and under the later emperors it became one of the most flourishing towns on the further side of the Alps. It still possesses numerous ancient remains, of which the most conspicuous are those of a Roman amphitheatre, which accommodated 24,000 spectators. Pop. 16,247.

**ARM**, the upper limb in man, connected with the thorax or chest by means of the scapula or shoulder-blade, and the clavicle or collar-bone. It consists of three bones, the arm-bone (humerus), and the two bones of the forearm (radius and ulna), and it is connected with the bones of the hand by the carpus or wrist. The head or upper end of the arm-bone fits into the hollow called the glenoid cavity of the scapula, so as to form a joint of the ball-and-socket kind, allowing great freedom of movement to the limb. The lower end of the humerus is broadened out by a projection on both the outer and inner sides (the outer and inner condyles), and has a pulley-like surface for articulating with the forearm to form the elbow-joint. This joint somewhat resembles a hinge, allowing of movement only in one direction. The ulna is the inner of the two bones of the forearm. It is largest at the upper end, where

it has two processes, the coronoid and the olecranon, with a deep groove between to receive the humerus. The radius—the outer of the two bones—is small at the upper end and expanded at the lower end, where it forms part of the



wrist-joint. The muscles of the upper arm are either flexors or extensors, the former serving to bend the arm, the latter to straighten it by means of the elbow-joint. The main flexor is the biceps, the large muscle which may be seen standing out in front of the arm when a weight is raised. The chief opposing muscle of the biceps is the triceps. The muscles of the forearm are, besides flexors and extensors, pronators and supinators, the former turning the hand palm downward, the latter turning it upward. The same fundamental plan of structure exists in the limbs of all vertebrate animals.

**ARMA'DA**, the Spanish name for any large naval force; usually applied to the Spanish fleet the Invincible Armada, intended to act against England A.D. 1588. It consisted of 130 great war vessels, and carried 19,295 marines, 8460 sailors, 2088 slaves, and 2630 cannons.

**ARMADIL'LO**, an edentate mammal peculiar to South America, consisting of various species, belonging to a family intermediate between the sloths and ant-eaters. They are covered with a hard bony shell, divided into belts, composed of small separate plates like a coat of mail, flexible everywhere except on the forehead, shoulders, and haunches, where it is not movable. The belts are connected by a membrane, which



Yellow-footed armadillo.

enables the animal to roll itself up like a hedgehog. These animals burrow in the earth, where they lie during the daytime, seldom going abroad except at night. They are of different sizes; the largest being 3 feet



in length without the tail, and the smallest only 10 inches. They subsist chiefly on fruits and roots, sometimes on insects and flesh. They are inoffensive, and their flesh is esteemed good food.—There is a genus of isopodous Crustacea called Armadillo, consisting of animals allied to the wood-lice, capable of rolling themselves into a ball.

**ARMAGEDDON** (-ged'don), the great battlefield of the Old Testament, where the chief conflicts took place between the Israelites and their enemies—the tableland of Esdraelon in Galilee and Samaria, in the center of which stood the town Megiddo, on the site of the modern Lejjun: used figuratively in the Apocalypse to signify the place of “the battle of the great day of God.”

**ARMAGH** (ár-mä'), a county of Ireland, in the province of Ulster; surrounded by Monaghan, Tyrone, Lough Neagh, Down, and Louth; area, 328,086 acres, of which about a half is under tillage. Pop. 125,238.—The county town, Armagh, is situated partly on a hill, about half a mile from the Callan. It is the see of an archbishop of the Protestant-Episcopal Church, who is primate of all Ireland, and is a place of great antiquity. Pop. 8303.

**ARMATURE**, a term applied to the piece of soft iron which is placed across the poles of permanent or electromagnets for the purpose of receiving and concentrating the attractive force. In the case of permanent magnets it is also important for preserving their magnetism when not in use, and hence it is sometimes termed the keeper. It produces this effect in virtue of the well-known law of induction, by which the armature, when placed near or across the poles of the magnet, is itself converted into a temporary magnet with reversed poles, and these, reacting upon the permanent magnet, keep its particles in a state of constant magnetic tension, or, in other words, in that constrained position which is supposed to constitute magnetism. A horseshoe magnet should therefore never be laid aside without its armature; and in the case of straight bar-magnets two should be placed parallel to each other, with their poles reversed, and a keeper or armature across them at both ends. The term is also applied to the core and coil of the electromagnet, which revolves before the poles of the permanent magnet in the magneto-electric machine.

**ARMED NEUTRALITY**, the condition of affairs when a nation assumes a threatening position, and maintains an armed force to repel any aggression on the part of belligerent nations between which it is neutral. The term is applied in history to a coalition entered into by the northern powers in 1780 and again in 1800.

**ARMED SHIP**, a ship which is taken into the service of a government for a particular occasion, and armed like a ship of war.

**ARMENIA**, a mountainous country of western Asia, not now politically existing, but of great historical interest as the original seat of one of the oldest civilized peoples in the world. It is now shared between Turkey, Persia, and

Russia. It has an area of about 137,000 square miles, and is intersected by the Euphrates, which divides it into the ancient divisions, Armenia Major and Armenia Minor. The country is an elevated plateau, inclosed on several sides by the ranges of Taurus and Anti-Taurus, and partly occupied by other mountains, the loftiest of which is Ararat. Several important rivers take their rise in Armenia, namely, the Kur or Cyrus, and its tributary the Aras or Araxes, flowing east to the Caspian Sea; the Halys or Kizil-Irmak, flowing north to the Black Sea; and the Tigris and Euphrates, which flow into the Persian Gulf. The chief lakes are Van and Urumiyah. The climate is rather severe. The soil is on the whole productive, though in many places it would be quite barren were it not for the great care taken to irrigate it. Wheat, barley, tobacco, hemp, grapes, and cotton are raised; and in some of the valleys apricots, peaches, mulberries, and walnuts are grown. The inhabitants are chiefly of the genuine Armenian stock, a branch of the Aryan or Indo-European race; but besides them, in consequence of the repeated subjugation of the country, various other races have obtained a footing. The total number of Armenians is estimated at 2,000,000, of whom probably one-half are in Armenia. The remainder, like the Jews, are scattered over various countries, and are generally engaged in commercial pursuits. They everywhere retain, however, their distinct nationality. Many thousands of them in Armenia have recently been massacred by the Turks.

Little is known of the early history of Armenia, but it was a separate state as early as the 8th century B.C., when it became subject to Assyria, as it also did subsequently to the Medes and the Persians. It was conquered by Alexander the Great in 325 B.C., but regained its independence about 190 B.C. Its king Tigranes, son-in-law of the celebrated Mithridates, was defeated by the Romans under Lucullus and Pompey about 69–66 B.C., but was left on the throne. Since then its fortunes have been various under the Romans, Parthians, Byzantine emperors, Persians, Saracens, Turks, etc. A considerable portion of it has been acquired by Russia in the 19th century, part of this in 1878.

The Armenians received Christianity as early as the 2d century. During the Monophysite disputes they held with those who rejected the twofold nature of Christ, and being dissatisfied with the decisions of the Council of Chalcedon (451) they separated from the Greek Church in 536. The popes have at different times attempted to gain them over to the Roman Catholic faith, but have not been able to unite them permanently and generally with the Roman Church. There are, however, small numbers here and there of United Armenians, who acknowledge the spiritual supremacy of the pope, agree in their doctrines with the Catholics, but retain their peculiar ceremonies and discipline. But the far greater part are yet Monophysites, and have remained faithful to their old religion and worship. Their doctrine

differs from the orthodox chiefly in their admitting only one nature in Christ, and believing the Holy Spirit to proceed from the Father alone. Their sacraments are seven in number. They adore saints and their images, but do not believe in purgatory. Their hierarchy differs little from that of the Greeks. The Catholicos, or head of the church, has his seat at Etchmiadzin, a monastery near Erivan, the capital of Russian Armenia, on Mount Ararat.

The Armenian language belongs to the Indo-European family of languages, and is most closely connected with the Iranian group. The Old Armenian or Haikan language, which is still the literary and ecclesiastical language, is distinguished from the new Armenian, the ordinary spoken language, which contains a large intermixture of Persian and Turkish elements. The most flourishing period of Armenian literature extended from the 4th to the 14th century. It then declined, but a revival began in the 17th century, and at the present day wherever any extensive community of Armenians have settled they have set up a printing-press. The Armenian Bible, translated from the Septuagint by Isaac or Sahak, the patriarch, early in the 5th century, is a model of the classic style.

**ARMINIANS**, a sect or party of Christians, so called from James Arminius or Harmensen, a Protestant divine of Leyden, who died in 1609. The Arminian doctrines are: (1) Conditional election and reprobation, in opposition to absolute predestination. (2) Universal redemption, or that the atonement was made by Christ for all mankind, though none but believers can be partakers of the benefit. (3) That man, in order to exercise true faith, must be regenerated and renewed by the operation of the Holy Spirit, which is the gift of God; but that this grace is not irresistible and may be lost, so that men may relapse from a state of grace and die in their sins.

**AR'MISTICE**, a temporary suspension of hostilities between two belligerent powers or two armies by mutual agreement, often concluded for only a few hours to bury the slain, remove the wounded, and exchange prisoners, as also sometimes to allow of a parley between the opposing generals. A general armistice is usually the preliminary of a peace.

**ARMOR PLATE**, steel plate used to protect vessels of war against the projectiles of an enemy. Although the idea is comparatively old, it was first brought into practical use by the engineer John Ericson, in the Monitor, which fought the iron-clad Merrimac during the war of emancipation. The object of having a hard face to armor is to break up projectiles by shock, or so to strain or deform them as to reduce their penetration. It is particularly effective on oblique impact (i.e. where the projectile strikes at an angle with the plate). To combine hardness with toughness was the aim of armor makers for a quarter of a century, and success was not obtained until the advent of nickel steel. Had not the improvement of projectiles and guns kept pace with



the development of armor, ships could now be made invulnerable; but both have improved so that the relation of guns and armor is now less favorable to the latter than at almost any time in its history. Nevertheless, armor is absolutely indispensable to the protection of ships and their crews against all classes of gunfire. The power of good Harvey nickel-steel armor to resist penetration is about equal to that of double the thickness of wrought iron, and the resisting power of Krupp armor is 10 to 15 per cent greater. These figures are for attack by ordinary armor-piercing projectiles. Projectiles of this type which are fitted with soft caps penetrate about as deeply in Krupp as in Harvey armor, and the gain by the use of caps is equal to a reduction in thickness of 8 to 10 per cent in Harvey armor and 15 to 20 in Krupp—that is to say, a capped projectile will perforate a Harvey plate 8 to 10 per cent thicker, or a Krupp plate 15 to 20 per cent thicker, than will a projectile not provided with a cap.

**ARMS, COAT OF, or ARMORIAL BEARINGS**, a collective name for the devices borne on shields, on banners, etc., as marks of dignity and distinction, and, in the case of family and feudal arms, descending from father to son. They were first employed by the Crusaders, and became hereditary in families at the close of the 12th century. They took their rise from the knights painting their banners or shields each with a figure or figures proper to himself, to enable him to be distinguished in battle when clad in armor. See Heraldry.

**ARMS and ARMOR.** The former term is applied to weapons of offense, the latter to the various articles of defensive covering used in war and military exercises, especially before the intro-

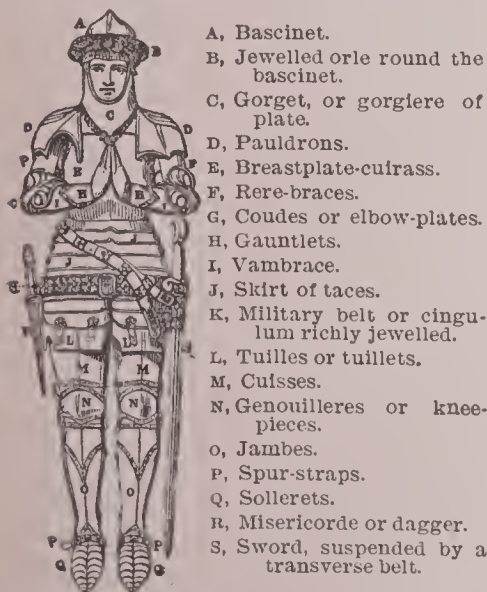
deadly by means of stone or bone, stone axes, slings, bows and arrows with heads of flint or bone, and afterward various weapons of bronze. Subsequently a variety of arms of iron and steel were introduced, which comprised



Allecret (light-plate) armor, A.D., 1540.

the sword, javelin, pike, spear or lance, dagger, ax, mace, chariot scythe, etc.; with a rude artillery consisting of catapults, ballistæ, and battering-rams. From the descriptions of Homer we know that almost all the Grecian armor, defensive and offensive, in his time was of bronze; though iron was sometimes

as a stabbing weapon. It was originally of bronze. The most characteristic weapon of the Roman legionary soldier, however, was the pilum, which was a kind of pike or javelin, some 6 feet or more in length. The pilum was sometimes used at close-quarters, but more commonly it was thrown. The favorite weapons of the ancient Germanic races were the battle-ax, the lance or dart, and the sword. The weapons of the Anglo-Saxons were spears, axes, swords, knives, and maces or clubs. The Normans had similar weapons, and were well furnished with archers and cavalry. The cross-bow was a comparatively late invention introduced by the Normans. Gunpowder was not used in Europe to discharge projectiles till the beginning of the 14th century. Cannon are first mentioned in England in 1338, and there seems to be no doubt that they were used by the English at the siege of Cambrai in 1339. The projectiles first used for cannon were of stone. Hand firearms date from the 15th century. At first they required two men to serve them, and it was necessary to rest the muzzle on a stand in aiming and firing. The first improvement was the invention of the match-lock, about 1476; this was followed by the wheel-lock; and about the middle of the 17th century by the flint-lock, which was in universal use until it was super-



Armor, from the effigy of Sir Richard Peyton, in Tong Church, Shropshire.

duction of gunpowder. Weapons of offense are divisible into two distinct sections: firearms, and arms used without gunpowder or other explosive substance. The first arms of offense would probably be wooden clubs, then would follow wooden weapons made more



used. The lance, spear, and javelin were the principal weapons of this age among the Greeks. The bow is not often mentioned. Among ancient nations the Egyptians seem to have been most accustomed to the use of the bow, which was the principal weapon of the Egyptian infantry. Peculiar to the Egyptians was a defensive weapon intended to catch and break the sword of the enemy. With the Assyrians the bow was a favorite weapon; but with them lances, spears, and javelins were in more common use than with the Egyptians. Most of the large engines of war, chariots with scythes projecting at each side from the axle, catapults, and ballistæ, seem to have been of Assyrian origin. During the historical age of Greece the characteristic weapon was a heavy spear from 21 to 24 feet in length. The sword used by the Greeks was short, and was worn on the right side. The Roman sword was from 22 to 24 inches in length, straight, two-edged, and obtusely pointed, and as by the Greeks was worn on the right side. It was used principally

sed by the percussion-lock, the invention of a Scotch clergyman early in the 19th century. The needle-gun dates from 1827. The only important weapon not a firearm that has been invented since the introduction of gunpowder is the bayonet, which is believed to have been invented about 1650. See Cannon, Musket, Rifle, etc.

Some kind of defensive covering was probably of almost as early invention as weapons of offense. The principal pieces of defensive armor used by the ancients were shields, helmets, cuirasses, and greaves. In the earliest ages of Greece the shield is described as of immense size, but in the time of the Peloponnesian war (about B.C. 420) it was much smaller. The Romans had two sorts of shields: the scutum, a large oblong rectangular highly convex shield, carried by the legionaries; and the parma, a small round or oval flat shield, carried by the light-armed troops and the cavalry. In the declining days of Rome the shields became larger and more varied in form. The helmet was





Germany.



United States of America.



Russia.



Great Britain.



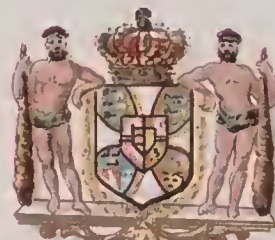
Chili.



Portugal.



Argentine Republic.



Denmark.



Persia.



Greece.



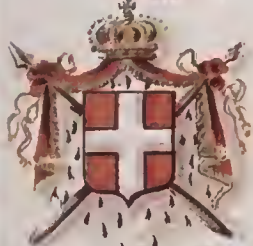
Netherlande.



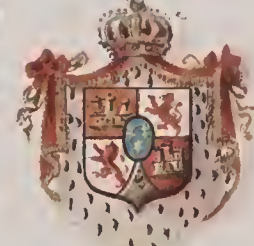
Austria-Hungary.



Sweden.



Italy.



Spain.



Belgium.



Republio of France.



Brazil.

# NATIONAL COAT OF ARMS.





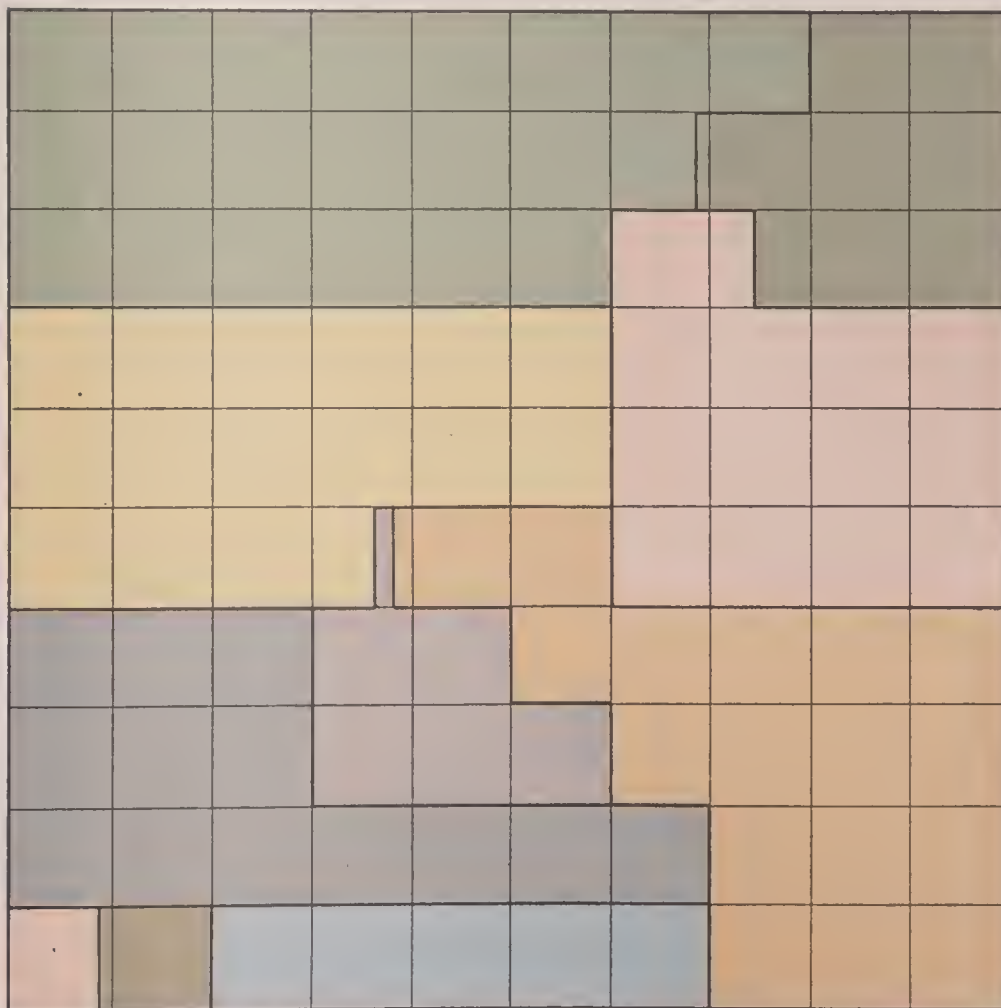


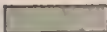
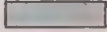


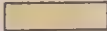





# MILITARY STRENGTH

## COMPARATIVE SIZES

### ARMIES OF THE WORLD ON WAR FOOTING

EACH SQUARE REPRESENTS 1% OF THE WORLD'S MILITARY STRENGTH



	RUSSIA	20.8%		UNITED KINGDOM	5.0%
	TURKEY	7.8 "		JAPAN	5.2 "
	GERMANY	15.6 "		SPAIN	1.1 "
	FRANCE	13.0 "		AUSTRIA	13.4 "
	ITALY	17.2 "		UNITED STATES	.9 "

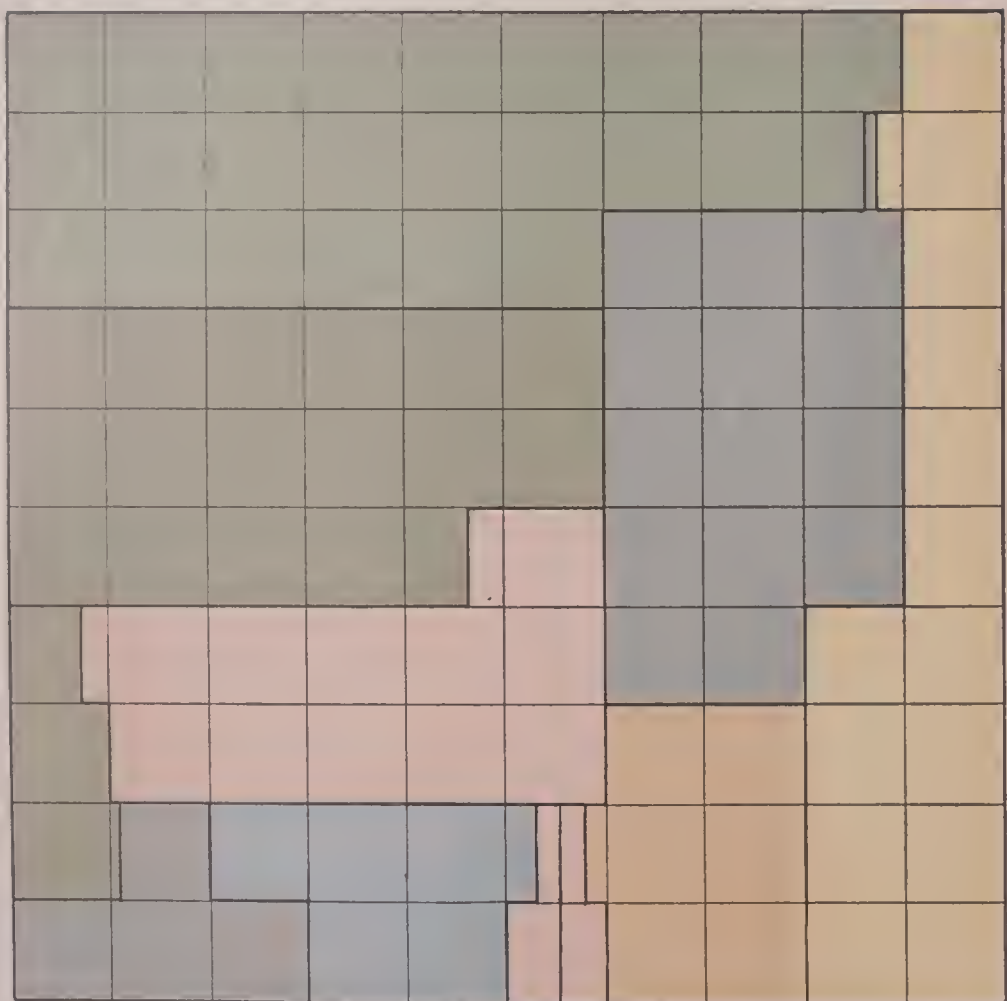



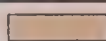
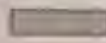

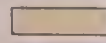
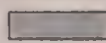
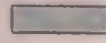

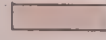
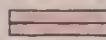
# MILITARY STRENGTH

## COMPARATIVE SIZES

### ARMIES OF THE WORLD ON PEACE FOOTING

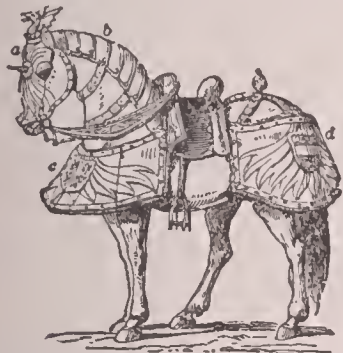
EACH SQUARE REPRESENTS 1% OF THE WORLD'S MILITARY STRENGTH



	RUSSIA	23.6 %		ITALY	6.2 %
	TURKEY	16.6 "		UNITED KINGDOM	5.3 "
	GERMANY	14.3 "		JAPAN	3.9 "
	FRANCE	14.1 "		SPAIN	2.8 "
	AUSTRIA	11.7 "		UNITED STATES	1.5 "



a characteristic piece of armor among the Assyrians, Greeks, Etruscans, and Romans. Like all other body armor it was usually made of bronze. The helmet of the historical age of Greece was distinguished by its lofty crest. The Roman helmet in the time of the early emperors fitted close to the head, and had a neckguard and hinged cheek-pieces fastened under the chin, and a small bar across the face for a visor.



Horse-armor of Maximilian I, of Germany.  
a, Chamfron. b, Manefaire. c, Poitrinal, pottrel or breastplate. d, Croupiere or buttock-piece.

Both Greeks and Romans wore cuirasses, at one time of bronze, but latterly of flexible materials. Greaves for the legs were worn by both, but among the Romans usually on one leg. The ancient Germans had large shields of plaited osier covered with leather, afterward their shields were small, bound with iron, and studded with bosses. The Anglo-Saxons had round or oval shields of wood, covered with leather, and having a boss in the center; and they had also corselets, or coats of mail, strengthened with iron rings. The Normans were well protected by mail; their shields were somewhat triangular in shape, their helmets conical. In Europe generally metal armor was used from the 10th to the 18th century, and at first consisted of a tunic made of iron rings firmly sewed flat upon strong cloth or leather. The rings were afterward interlinked one with another so as to form a garment of themselves, called chain-mail. Great variety is found in the pattern of the armor, and in some cases small pieces of metal were used instead of rings, forming what is called scale-armor. A suit of armor consisting of larger pieces of metal, called plate-armor, was now introduced, and the whole body came to be incased in a heavy metal covering. The various forms of ring or scale armor were gradually superseded by the plate-armor, which continued to be worn until long after the introduction of firearms and field-artillery.

**ARMOUR**, Philip Danforth, an American merchant, born at Stockbridge, N. Y., 1832, died in 1901. He received a public school education, and traveled as a youth to California, but settled in Milwaukee in 1852. In 1863 he founded the house of Armour, Plankington & Co., packers, the offices of which were removed to Chicago in 1870, where the house was soon reorganized as Armour & Co. Mr. Armour was not only a good business man, but a philanthropist as well. He founded the Armour Institute of Technology

at Chicago, and the Armour Mission in the same city at an expense of \$2,-500,000.

**ARMSTRONG**, William George, Lord, engineer and mechanical inventor, born at Newcastle-on-Tyne, 10th Nov., 1810. He was trained as a solicitor, and practiced as such for some time, though his tastes scarcely lay in that direction. Among his early inventions were the hydro-electric machine, a powerful apparatus for producing frictional electricity, and the hydraulic crane. In 1847 the Elswick works, near Newcastle, were established for the manufacture of his cranes and other heavy iron machinery, and these works are now among the most extensive of their kind. Here the first rifled ordnance gun which bears his name was made in 1854. His improvements in the manufacture of guns and shells led to his being appointed engineer of rifled ordnance under government, and he was knighted in 1858. This appointment came to an end in 1863, since which time his ordnance has taken a prominent place in the armaments of different countries. He was raised to the peerage as Baron Armstrong in 1887. He died in 1901.

**ARMSTRONG GUN**, a kind of cannon, so called from its inventor, made of wrought-iron, principally of spirally-coiled bars, so disposed as to bring the metal into the most favorable position for the strain to which it is to be exposed, and occasionally having an inner tube or core of steel, rifled with numerous shallow grooves. The size of these guns ranges from the smallest field-piece to pieces of the highest caliber. The projectile is coated with lead, and inserted into a chamber behind the bore. This the explosion drives forward, compressing its soft coating into the grooves, so as to give it a rotary motion, and at the same time obviate windage. Both breech-loading and muzzle-loading Armstrong guns have been made.

**ARMY**, an organized body of drilled and disciplined men, furnished with weapons of offense and defense, for the protection of a state against external attack, for making war on foreign states or other enemies, and for the preservation of order within the state itself.

War in savage communities is carried on by armies of the comparatively crude organization, and the ancient army was a succession of mere lines of men, shoulder to shoulder, the cavalry being organized on virtually the same plan. The introduction of the Macedonian phalanx by Philip and its use by Alexander the Great was the first step toward the modern mobile regiment. The phalanx was ground to powder by the Roman legion which superceded it, and the legion itself was brought to perfection by its subdivision into centuries, each with a captain, or centurion. This is the modern company, and the modern regiment is substantially the same thing as the Roman legion.

An army, in the modern sense, has four branches, each with its separate function, yet each of which may be brought into coordination with the others. These branches are the infantry, cavalry, artillery, and engineer corps. A fifth and sixth branch, that

is, hospital corps and signal corps, are not fighting branches proper.

The unit of infantry is the battalion, consisting of about 1000 men, divided into companies of say 250 each. Three or four battalions go to make a regiment, and three regiments, in the United States, comprise a brigade. Certain European countries make use of a mounted infantry, particularly Great Britain, and others have recently organized infantry bodies for the use of machine and automatic guns which cannot properly be classified with artillery.

In the United States army the unit of cavalry is the squadron of 150 mounted men armed with sabers. The squadron is subdivided into four troops, each of 100 men, when complete. A regiment of cavalry consists of three squadrons, the brigade consists of three regiments.

The unit of artillery is, in the United States army, a battery. The field battery has 175 men and 250 horses, the horse battery has 165 men and 235 horses. Normally the battery has 6 guns, but the tendency is toward a reduction of this number. It is believed that four guns will be the number which will constitute the battery of the United States army in the future. A battalion of artillery consists of three or four batteries, and the artillery regiment of three or four battalions.

These various units combine together into larger units, such as the division consisting of two brigades, and the army corps, which consists of two divisions of infantry, one regiment of field artillery, and other services. In the United States the army corps is composed of three divisions, several regiments of cavalry, and artillery.

The engineer corps is organized into battalions of four companies each, the latter into regiments of two battalions each, including a balloon section. The organization of the engineer corps is substantially the same as that of the infantry.

The army of the United States has a signal corps which operates the field telegraph, the military balloons, wireless telegraphy, and the old-fashioned signaling by flag, torch, heliograph, etc. An army corps carries one company of signal corps, numbering 175 men.

The medical department of the army includes the hospital corps, the surgeons taking the rank of officers according to grade.

**ARMY SCHOOLS.** See Military Schools.

**ARMY WORM**, the very destructive larva of a moth, so called from its habit of marching in compact bodies of enormous number, devouring almost every green thing it meets. It is about 1½ inches long, greenish in color, with black stripes, and is found in various parts of the world, but is particularly destructive in North America.

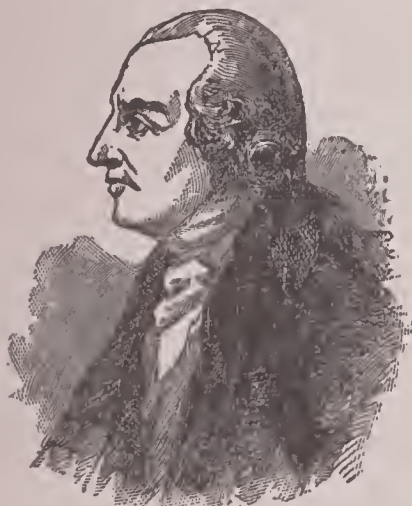
**ARN'HEM**, or **ARNHEIM**, a town in Holland, prov. of Gelderland, 18 miles southwest of Zutphen, on the right bank of the Rhine. In 1795 it was stormed by the French, who were driven from it by the Prussians in 1813. Pop. 57,498.



## ARNICA

**AR'NICA**, a genus of plants, consisting of some twelve species, one of which is found in central Europe, leopard's bane or mountain tobacco, but is not a native of Britain. It has a perennial root, a stem about 2 feet high, bearing on the summit flowers of a dark golden yellow. In every part of the plant there is an acrid resin and a volatile oil, and in the flowers an acrid bitter principle called arnicin. The root contains also a considerable quantity of tannin. A tincture of it is employed as an external application to wounds and bruises.

**AR'NOLD**, Benedict, a general in the American army during the war of independence, who rendered his name infamous by his attempt to betray the strong fortress of West Point, with all



*B. Arnold M. Genl*

the arms and immense stores which were there deposited, into the hands of the British. The project failed through the capture of Major André, when Arnold made his escape to the British lines. He received a commission as major-general in the British army, and took part in several marauding expeditions. He subsequently settled in the West Indies, and ultimately went to London, where he died in 1801, aged 61.

**AR'NOLD**, Edwin, K.C.I.E., poet, Sanskrit scholar, and journalist, born 1832. Educated at Oxford, where he took the Newdigate prize for a poem entitled *The Feast of Belshazzar*. He is author of *Poems*, narrative and lyrical, numerous translations from the Greek and Sanskrit; *The Light of Asia*, a poem presenting the life and teaching of Gautama, the founder of Buddhism. Died 1904.

**AR'NOLD**, Matthew, English critic, essayist, and poet, was born at Laleham, near Staines, 1822, being a son of Dr. Arnold, of Rugby. He was educated at Winchester, Rugby, and Oxford, and became a Fellow of Oriel College. He received the degree of LL.D. from both Oxford and Edinburgh, and lectured in Britain and in America. He died in 1888.

**AR'NOLD**, Thomas, head-master of Rugby School, and professor of modern history in the University of Oxford, born at Cowes, in the Isle of Wight, in 1795, died 1842. Not only did Rugby

School become crowded beyond any former precedent, but the superiority of Dr. Arnold's system became so generally recognized that it may be justly said to have done much for the general improvement of the public schools of England.

**ARNSBERG** (ärnz'berh), a town in Prussia, prov. of Westphalia, capital of the government of same name on the Ruhr. Pop. 8488.—The government of Arnsberg has an area of 2972 square miles, and a population of 1,851,319.

**ARO'MA**, the distinctive fragrance exhaled from spices, plants, etc., generally an agreeable odor, a sweet smell.

**AROMAT'ICS**, drugs, or other substances which yield a fragrant smell, and often a warm pungent taste, as calamus, ginger, cinnamon, cassia, lavender, rosemary, laurel, nutmegs, cardamoms, pepper, pimento, cloves, vanilla, saffron. Some of them are used medicinally as tonics, stimulants, etc.

**AROMATIC VINEGAR**, a very volatile and powerful perfume made by adding the essential oils of lavender, cloves, etc., and often camphor, to crystallizable acetic acid. It is a powerful excitant in fainting, languor, and headache.

**ARPEGGIO** (är-pej'ō), the distinct sound of the notes of an instrumental chord; the striking the notes of a chord in rapid succession, as in the manner of touching the harp instead of playing them simultaneously.

**AR'QUEBUS**, a hand-gun; a species of fire-arm resembling a musket anciently used. It was fired from a forked rest, and sometimes cocked by a wheel, and carried a ball that weighed nearly two ounces. A larger kind used in fortresses carried a heavier shot.

**AR'RAH**, a town of British India, in Shahabad district, Bengal, rendered famous during the mutiny of 1857 by the heroic resistance of a body of twenty civilians and fifty Sikhs, cooped up within a detached house, to a force of 3000 sepoys, who were ultimately routed and overthrown by the arrival of a small European reinforcement. Pop. 46,905.

**ARRAIGNMENT** (ar-rān'-), the act of calling or setting a prisoner at the bar of a court to plead guilty or not guilty to the matter charged in an indictment or information.

**ARRANGEMENT**, in music, the adaptation of a composition to voices or instruments for which it was not originally written; also, a piece so adapted.

**ARREST** is the apprehending or restraining of one's person, which, in civil cases, can take place legally only by process in execution of the command of some court or officers of justice; but in criminal cases any man may arrest without warrant or precept, and every person is liable to arrest without distinction, but no man is to be arrested unless charged with such a crime as will at least justify holding him to bail when taken. Magna Charta and the Habeas Corpus Act are the two great statutes for securing the liberty of the subject against unlawful arrests and suits.

**ARREST OF JUDGMENT**, in law, the staying or stopping of a judgment after verdict, for causes assigned. Courts

## ARSENAL

have power to arrest judgment for intrinsic causes appearing upon the face of the record; as when the declaration varies from the original writ; when the verdict differs materially from the pleadings; or when the case laid in the declaration is not sufficient in point of law to found an action upon.

**ARRONDISSEMENT** (ä-rön-dēs-män), in France an administrative district, the subdivision of a department, or of the quarters of some of the larger cities.

**ARROWHEAD**, a genus of aquatic plants found in all parts of the world within the torrid and temperate zones, distinguished by possessing barren and fertile flowers, with a three-leaved calyx and three colored petals.

**ARROW-ROOT**, a starch largely used for food and for other purposes. Arrow-root proper is obtained from the rhizomes or rootstocks of several species of plants, and perhaps owes its name



Arrow-root plant. a. a. Rhizomes.

to the scales which cover the rhizome, which have some resemblance to the point of an arrow. Some, however suppose that the name is due to the fact of the fresh roots being used as an application against wounds inflicted by poisoned arrows, and others say that arrow is a corruption of ara, the Indian name of the plant. The species from which arrow-root is most commonly obtained is called the arrow-root plant. Brazilian arrow-root, or tapioca meal, is got from the large fleshy root, after the poisonous juice has been got rid of; East Indian arrow-root, from the large root-stalks; Chinese arrow-root, from the creeping rhizomes; English arrow-root, from the potato; and Oswego arrow-root, from Indian corn.

**ARROWSMITH**, Aaron, a distinguished English cartographer, born 1750, died 1823; he raised the execution of maps to a perfection it had never before attained. His nephew, John, born 1790, died 1873, was no less distinguished in the same field.

**AR'SENAL**, a royal or public magazine or place appointed for the making, repairing, keeping, and issuing of military stores. An arsenal of the first class should include factories for guns and gun-carriages, small-arms, small-arms ammunition, harness, saddlery, tents, and powder; a laboratory and large store-houses. In arsenals of the second class workshops take the place of the factories.



## ARSENIC

**AR'SENIC**, a metallic element of very common occurrence, being found in combination with many of the metals in a variety of minerals. It is of a dark-gray color, and readily tarnishes on exposure to the air, first changing to yellow, and finally to black. In hardness it equals copper; it is extremely brittle, and very volatile, beginning to sublime before it melts. It burns with a blue flame, and emits a smell of garlic. Its specific gravity is 5.76. It forms alloys with most of the metals. Combined with sulphur it forms orpiment and realgar, which are the yellow and red sulphides of arsenic. Orpiment is the true arsenicum of the ancients. With oxygen arsenic forms two compounds, the more important of which is arsenious oxide or arsenic trioxide ( $As_2O_3$ ), which is the white arsenic, or simply arsenic of the shops. It is usually seen in white, glassy, translucent masses, and is obtained by sublimation from several ores containing arsenic in combination with metals, particularly from arsenical pyrites. Of all substances arsenic is that which has most frequently occasioned death by poisoning, both by accident and design. The best remedies against the effects of arsenic on the stomach are hydrated sesquioxide of iron or gelatinous hydrate of magnesia, or a mixture of both, with copious draughts of bland liquids of a mucilaginous consistence, which serve to procure its complete ejection from the stomach. Oils and fats generally, milk, albumen, wheat-flour, oatmeal, sugar or syrup, have all proved useful in counteracting its effect. Like many other virulent poisons it is a safe and useful medicine, especially in skin diseases, when judiciously employed. It is used as a flux for glass, and also for forming pigments. The arsenite of copper and a double arsenite and acetate of copper are largely used by painters; they are also used to color paper-hangings for rooms, a practice not unaccompanied with considerable danger, especially if flock-papers are used or if the room is a confined one. Arsenic has been too frequently used to give that bright green often seen in colored confectionery, and to produce a green dye for articles of dress and artificial flowers.

**AR'SON**, in English law, the malicious burning of a dwelling-house or outhouse of another man, which by the common law is felony, and which, if any person is therein, is capital. Also, the wilful setting fire to any church, chapel, warehouse, mill, barn, agricultural produce, ship, coal-mine, and the like.

**ART**, in its most extended sense, as distinguished from nature on the one hand and from science on the other, has been defined as every regulated operation or dexterity by which organized beings pursue ends which they knew beforehand, together with the rules and the result of every such operation or dexterity. In this wide sense it embraces what are usually called the useful arts. In a narrower and purely æsthetic sense it designates what is more specifically termed the fine arts, as architecture, sculpture, painting, music, and poetry. The useful arts have their origin in positive practical needs, and

restrict themselves to satisfying them. The fine arts minister to the sentiment of taste through the medium of the beautiful in form, color, rhythm, or harmony. See Painting, Sculpture, etc.—In the middle ages it was common to give certain branches of study the name of arts. See Arts.

**AR'TEMUS WARD.** See Browne, Charles Farrar.

**AR'TERIES**, the system of cylindrical vessels or tubes, membranous, elastic, and pulsatile, which convey the blood from the heart to all parts of the body, by ramifications which as they proceed diminish in size and increase in number, and terminate in minute capillaries uniting the ends of the arteries with the beginnings of the veins. There are two principal arteries or arterial trunks: the aorta, which rises from the left ventricle of the heart and ramifies through the whole body, sending off great branches to the head, neck, and upper limbs and downward to the lower limbs, etc.; and the pulmonary artery, which conveys venous blood from the right ventricle to the lungs, to be purified in the process of respiration.

**ARTERIOT'OMY**, the opening or cutting of an artery for the purpose of blood-letting, as, for instance, to relieve pressure of the brain in apoplexy.

**ARTE'SIAN WELLS**, so called from the French province of Artois, where they appear to have been first used on an extensive scale, are perpendicular borings into the ground through which water rises to the surface of the soil, producing a constant flow or stream, the ultimate sources of supply being higher than the mouth of the boring, and the water thus rising by the well-known law. They are generally sunk in valley plains and districts where the lower pervious strata are bent into basin-shaped curves. The rain falling on the outcrops of these saturates the whole porous bed, so that when the bore reaches it the water by hydraulic pressure rushes up toward the level of the highest portion of the strata. The supply is sometimes so abundant as to be used extensively as a moving power, and in arid regions for fertilizing the ground, to which purpose artesian springs have been applied from a very remote period. Thus many artesian wells have been sunk in the Algerian Sahara which have proved an immense boon to the district. The water of most of these is potable, but a few are a little saline, though not to such an extent as to influence vegetation. The hollows in which London and Paris lie are both perforated in many places by borings of this nature. One of the most celebrated artesian wells is that of Grenelle near Paris, 1798 feet deep, completed in 1841, after eight years' work. An artesian well at Budapest has a depth of 3182 feet; another at St. Louis, Mo., is 3843 feet deep. As the temperature of water from great depths is invariably higher than that at the surface, artesian wells have been made to supply warm water for heating manufactories, greenhouses, hospitals, fishponds, etc. Petroleum wells are generally of the same technical description. Artesian wells are now made with larger diameters than formerly, and al-

## ARTHUR

together their construction has been rendered much more easy in modern times. See Boring.

**AR'THUR**, Chester Alan, the twenty-first president of the United States. He was born at Fairfield, Vt., Oct. 5, 1830, and died at New York Nov. 18, 1886. After taking his degree at Union College, in 1848, Mr. Arthur taught in various schools for a number of years, studying law meanwhile, and when the civil war broke out he was quite prominent in politics. An earnest abolitionist, he sided with the republican party, or, rather, was one of the founders and original members of that party. Soon after the beginning of the war Mr. Arthur was entrusted by General Morgan with the armament and commissariat of the



Chester A. Arthur.

New York troops—a duty in which he displayed such ability that he was soon promoted to the positions of engineer-in-chief, inspector-general, and quartermaster general. From 1871 to 1878 he was collector of the port of the city of New York, and when during the canvass for the next election the republican party was split Mr. Arthur adopted the "Stalwart" side. In the convention that followed Grant was a strong candidate, but the anti-Stalwarts defeated him and nominated Garfield. Not desiring to cause disaffection at the polls Mr. Arthur was placed on the ticket as candidate for vice-president. Garfield was assassinated and Mr. Arthur succeeded to the presidency on Sept. 19, 1881. Although there were some misgivings as to his course, Mr. Arthur made an acceptable president. His administration was not marked by any particular event of importance and he was unsuccessful in his candidacy for nomination before the succeeding convention.

**AR'THUR**, Julia, an American actress, born at Hamilton, Ont., in 1869. She studied the stage abroad and her first American successes were with A. M. Palmer's companies. She has played in *The Black Masque*, *Becket*, *A Lady of Quality*, and other plays. She retired in 1900.

**AR'THUR**, King, an ancient British hero of the 6th century, son of Uther Pendragon and the Princess Igerna, wife of Gorlois, duke of Cornwall. He married Guinevere or Ginevra; estab-



lished the famous order of the Round Table; and reigned, surrounded by a splendid court, twelve years in peace. After this, as the poets relate, he conquered Denmark, Norway, and France, slew the giants of Spain, and went to Rome. From thence he is said to have hastened home on account of the faithlessness of his wife, and Modred, his nephew, who had stirred up his subjects to rebellion. He subdued the rebels, but died in consequence of his wounds, on the island of Avalon. The story of Arthur is supposed to have some foundation in fact, it is generally believed that Arthur was one of the last great Celtic chiefs who led his countrymen from the west of England to resist the settlement of the Saxons in the country. But many authorities regard him as a leader of the Cymry of Cumbria and Strath-Clyde against the Saxon invaders of the east coast and the Picts and Scots north of the Forth and the Clyde.

**ARTHUR**, Timothy Shay, an American writer born in New York in 1809, died in 1885. He is principally known for his story *Ten Nights in a Bar room*.

**ARCTIC EXPLORATION**. See Polar Exploration.

**ARTICHOKE**, a well-known plant, somewhat resembling a thistle, with large divided prickly leaves. The erect flower-stem terminates in a large round head of numerous imbricated oval spiny scales which surround the flowers. The fleshy bases of the scales with the large receptacle are the parts that are eaten.

**ARTICLE**, in grammar, a part of speech used before nouns to limit or define their application. In English a or an is usually called the indefinite article (the latter form being used before a vowel sound), and the, the definite article, but they are also described as adjectives. An was originally the same as one, and the as that. In Latin there were no articles, and Greek has only the definite article.

**ARTICLES**, The Thirty-nine, of the Church of England, a statement of the particular points of doctrine, thirty-nine in number, maintained by the English Church; first promulgated by a convocation held in London in 1562-63, and confirmed by royal authority; founded on and superseding an older code issued in the reign of Edward VI. They were ratified anew in 1604 and 1628. All candidates for ordination must subscribe these articles. This formulary is now accepted by the Episcopal Churches of Scotland, Ireland, and America.

**ARTICULA'TA**, the third great section of the animal kingdom according to the arrangement of Cuvier, including all the invertebrates with the external skeleton forming a series of rings articulated together and enveloping the body, distinct respiratory organs, and an internal ganglionated nervous system along the middle line of the body. They are divided into five classes, viz. Crustacea, Arachnida, Insecta, Myriapoda, and Annelida. The first four classes are now commonly placed together under the name of Arthropoda, and the whole are sometimes called Arthrozoa.

**ARTICULA'TION**, in anatomy a joint; the joining or juncture of the bones. This is of three kinds: (1) a movable connection, such as the ball-and-socket joint; (2) immovable connection, as by suture, or junction by serrated margins; (3) union by means of another substance, by a cartilage, tendon, or ligament.

**ARTIFICIAL LIMBS**, legs or arms of wood, cork, or other material, made to replace the natural members which have been lost by disease or accident. The art of making artificial limbs is almost as old as history. Legs of bronze, ivory, and wood have been found on skeletons exhumed from tombs which date back to the fourth century before Christ. Artificial hands, feet and limbs were common during the middle ages. The earliest American invention in this line was the leg patented in 1846 by B. F. Palmer, which at once superseded all others of its kind. Other Americans followed Palmer, and the most serviceable legs and arms manufactured today are those made from American patents. The arm is usually mounted with a rubber hand, which is often of immense service to the wearer. Artificial legs consist of a hollow sheath or bucket, accurately fitting the stump and provided with a "pin" to reach the ground. This structure is fitted with a rubber foot, and, simple as the structure may appear, it admirably supplies the place of the natural member.

**ARTIL'LERY**, all sorts of great guns, cannon, or ordnance, mortars, howitzers, machine-guns, etc., together with all the apparatus and stores thereto belonging, which are taken into the field, or used for besieging and defending fortified places. The improvements and alterations in artillery and projectiles have of late years been extraordinary, there being in the British service alone over 100 patterns of modern guns. Of these the largest is the 111-ton gun intended for ships and fortresses, the next largest being the 100-ton gun for land service, and the 80-ton gun for land and sea service. The most important modern improvements in artillery, besides the increase in size, is the general adoption of rifled ordnance, breech-loaders, and machine-guns. See Cannon, and other articles.—The name Park of Artillery is given to the entire train of artillery accompanying a military force, with the apparatus, ammunition, etc., as well as the battalion appointed for its service and defense.

**ARTILLERY COMPANY**, the Ancient and Honorable, of Boston, a historical company of artillery, the oldest military company of America, dating to 1637. Its functions today are social.

**ARTILLERY CORPS**, the entire artillery branch of the United States army. It consists of a commanding chief, 14 colonels, 13 lieutenant-colonels, 39 majors, 195 captains, 48 sergeants, 31 batteries field, and 126 batteries coast artillery. Total, 18,920 men and 651 officers.

**ARTILLERY SCHOOL**, a military school of the United States at Fort Monroe, Va., for the teaching of

the theory and practice of artillery work.

**ARTIODAC'TYLA**, a section of the Ungulata or hoofed mammals, comprising all those in which the number of the toes is even (two or four), including the ruminants, such as the ox, sheep, deer, etc., and also a number of non-ruminating animals, as the hippopotamus and the pig.

**ARTS**, the name given to certain branches of study in the middle ages, originally called the "liberal arts" to distinguish them from the "servile arts" or mechanical occupations. These arts were usually given as grammar, dialectics, rhetoric, music, arithmetic, geometry, and astronomy. Hence originated the terms "art classes," "degrees in arts," "Master of Arts," etc., still in common use in universities, the faculty of arts being distinguished from those of divinity, law, medicine, or science.

**ART STUDENTS' LEAGUE**, an American art society with a membership of 1000 and headquarters at New York. It was an offshoot from the academy of design, and was founded in 1878. A fee of \$30 to \$70 is charged, and the member is instructed by competent teachers. Scholarships and prizes are awarded annually.

**ASAFET'IDA**, **ASAFETIDA**, a fetid inspissated sap from central Asia. It is used in medicine as an anti-spasmodic, and in cases of flatulency, in hysteric paroxysms, and other nervous affections. Notwithstanding its very disagreeable odor it is used as a seasoning in the East, and sometimes in Europe. An inferior sort is the product of certain species of Ferula.

**ASBES'TOS**, **ASBESTUS**, a remarkable and highly useful mineral, a fibrous variety of several members of the hornblende family, composed of separable filaments, with a silky luster. The fibers are sometimes delicate, flexible, and elastic; at other times stiff and brittle. It is incombustible, and anciently was wrought into a soft, flexible cloth, which was used as a shroud for dead bodies. In modern times it has been manufactured into incombustible cloth, gloves, felt, paper, etc.; is employed in gas-stoves; is much used as a covering to steam boilers and pipes; is mixed with metallic pigments, and used as a paint on wooden structures, roofs, partitions, etc., to render them fire-proof, and is employed in various other ways, the manufacture having recently greatly developed. Some varieties are compact and take a fine polish, others are loose, like flax or silky wool.

**ASCENSION**, Right, of a star, in astronomy, the arc of the equator intercepted between the first point of Aries and that point of the equator which comes to the meridian at the same instant with the star.

**ASCENSION DAY**, the day on which the ascension of the Savior is commemorated, often called Holy Thursday, a movable feast, always falling on the Thursday but one before Whitsuntide.

**ASCET'ICS**, a name given in ancient times to those Christians who devoted themselves to severe exercises of piety and strove to distinguish themselves



from the world by abstinence from sensual enjoyments and by voluntary penances. Ascetics and asceticism have played an important part in the Christian church, but the principle of striving after a higher and more spiritual life by subduing the animal appetites and passions has no necessary connection with Christianity. Thus there were ascetics among the Jews previous to Christ, and asceticism was inculcated by the Stoics, while in its most extreme form it may still be seen among the Brahmas and Buddhists. Monasticism was but one phase of asceticism.

**AS'COLI**, or **ASCOLI PICENO**, capital of the province of the same name, on the Tronto, 14 miles above its embouchure in the Adriatic. Pop. 11,199.—The province has an area of 809 sq. miles, a pop. of 222,146.

**ASH**, a genus of deciduous trees having imperfect flowers and a seed-vessel prolonged into a thin wing at the apex. There are many varieties of it, as the weeping-ash, the curled-leaved ash, the entire-leaved ash, etc. Among American species are the white ash, with lighter bark and leaves; the red or black ash, with a brown bark; the black ash, the blue ash, the green ash, etc. They are all valuable trees. The mountain-ash or rowan belongs to a different order.

**ASH, ASHES**, the incombustible residue of organic bodies (animal or vegetable) remaining after combustion; in common usage, any incombustible residue of bodies used as fuel; as a commercial term, the word generally means the ashes of vegetable substances, from which are extracted the alkaline matters called potash, pearl-ash, kelp, barilla, etc.

**ASHANTEE'**, a kingdom of western Africa, in the interior of the Gold Coast, and to the north of the river Prah, with an area of about 70,000 sq. miles. It is in great part hilly, well-watered, and covered with dense tropical vegetation. The country round the towns, however, is carefully cultivated. The crops are chiefly rice, maize, millet, sugar-cane, and yams, the last forming the staple vegetable food of the natives. The domestic animals are cows, horses of small size, goats, and a species of hairy sheep. The larger wild animals are the elephant, rhinoceros, giraffe, buffalo, lion, hippopotamus, etc. Birds of all kinds are numerous, and crocodiles and other reptiles abound. Gold is abundant, being found either in the form of dust or in nuggets. The Ashantees are warlike and ferocious, with a love of shedding blood amounting to a passion, human sacrifices being formerly common. Polygamy is practiced by them to an enormous extent. They make excellent cotton cloths, articles in gold, and good earthenware, tan leather, and make sword-blades of superior workmanship. The government is a monarchy, and is now carried on under British supervision, Ashantee having become a protectorate of Britain in 1896. The chief town is Coomassie, said to have from 70,000 to 100,000 inhabitants.

**ASHEVILLE** (ash'vil), a city and county seat of Buncombe Co., N. C., 262 miles by rail northeast of Atlanta,

Ga.; at the junction of the Swannanoa and the French Broad rivers and on the Southern Railway. It is finely situated, at an elevation of 2300 feet in a mountainous region, and is widely celebrated as a health resort, both summer and winter. Pop. 15,000.

**ASH'BURTON**, Alexander Baring, Lord, a British statesman and financier, born 1774, died 1848. After serving in parliament for many years he was raised to the peerage in 1835, after being a member of Peel's government (1834-35).

**ASH'BURTON TREATY**, a treaty concluded at Washington, 1842, by Alexander Baring, Lord Ashburton, and the President of the United States; it defined the boundaries between the States and Canada, etc.

**ASH'ES**. See Ash.

**ASH'LAND**, a city and county seat of Ashland Co., Wis., 185 miles northeast of Saint Paul, Minn., on Chequamegon Bay, one of the finest harbors on Lake Superior. Steamers connect it with lake ports, and it is on the Wisconsin Central, the Chicago, Saint Paul, Minneapolis, and Omaha, the Northern Pacific, and the Chicago and Northwestern railroads. Ashland is one of the most important ports on the Great Lakes, the point from which the product of the iron mines of the Gogebic Range is shipped. Lumber, brown-stone, and the principal manufactured products also constitute extensive shipments. Pop. 15,000.

**ASHLEY**, Lord. See Shaftesbury, First Earl of.

**ASHTABULA**, a city in Ashtabula Co., Ohio, on a river of the same name, 3 miles from Lake Erie, and 54 miles east by north of Cleveland, on the Lake Shore and Michigan Southern, the New York, Chicago, and St. Louis, and the Pittsburgh, Youngstown, and Ashtabula railroads. Pop. 14,000.

**ASH-WEDNESDAY**, the first day of Lent, so called from a custom in the Western Church of sprinkling ashes that day on the heads of penitents, then admitted to penance. The period at which the fast of Ash-Wednesday was instituted is uncertain. In the R. Catholic Church the ashes are now strewn on the heads of all the clergy and people present. In the Anglican Church Ash-Wednesday is regarded as an important fast day.

**ASIA**, the largest of the great divisions of the earth; length, from the extreme southwestern point of Arabia, at the strait of Babel-Mandeb, to the extreme northeastern point of Siberia—East Cape, or Cape Vostochni, in Bering's strait—6900 miles; breadth, from Cape Chelyuskin, in northern Siberia, to Cape Romania, the southern extremity of the Malay Peninsula, 5300 miles; area estimated at 17,296,000 square miles, about a third of all the land of the earth's surface. On three sides, n., e., and s., the ocean forms its natural boundary, while in the w. the frontier is marked mainly by the Ural Mountains, the Ural River, Caspian Sea, the Caucasus, the Black Sea, the Mediterranean, the Suez Canal, and the Red Sea. There is no proper separation between Asia and Europe, the latter being really a great peninsula of the former. Asia, though not so ir-

regular in shape as Europe, is broken in the s. by three great peninsulas, Arabia, Hindustan, and Farther India, while the east coast presents peninsular projections and islands, forming a series of sheltered seas and bays, the principal peninsulas being Kaintchatka and Corea. The principal islands are those forming the Malay or Asiatic Archipelago, which stretch round in a wide curve on the s.e. of the continent. Besides the larger islands—Sumatra, Java, Borneo, Celebes, Mindanao, and Luzon (in the Philippine group)—there are countless smaller islands grouped round these. Other islands are Ceylon, in the s. of India; the Japanese islands and Sakhalin on the east of the continent; Formosa, s.e. of China; Cyprus, s. of Asia Minor; and New Siberia and Wrangell Land, in the Arctic Ocean.

The mountain systems of Asia are of great extent, and their culminating points are the highest in the world. The greatest of all is the Himalayan system, which lies mainly between lon. 70° and 100° e. and lat. 28° and 37° n. It extends, roughly speaking, from northwest to southeast, its total length being about 1500 miles, forming the northern barrier of Hindustan. The loftiest summits are Mount Everest, 29,002 feet high, Godwin-Austen, 28,265, and Kanchinjinga, 28,156. The principal passes, which rise to the height of 18,000 to 20,000 feet, are the highest in the world. A second great mountain system of central Asia, connected with the northwestern extremity of the Himalayan system by the elevated region of Pamir (about lon. 70°-75° e., lat. 37°-40° n.), is the Thian-Shan system, which runs northeastward for a distance of 1200 miles. In this direction the Altai, Sayan, and other ranges continue the line of elevations to the northeastern coast. A northwestern continuation of the Himalayas is the Hindu Kush, and farther westward a connection may be traced between the Himalayan mass and the Elburz range (18,460 feet), south of the Caspian, and thence to the mountains of Kurdistan, Armenia, and Asia Minor.

There are vast plateaux and elevated valley regions connected with the great central mountain systems, but large portions of the continent are low and flat. Of the deserts of Asia the largest is that of Gobi (lon. 90°-120° e., lat. 40°-48° n.), large portions of which are covered with nothing but sand or display a surface of bare rock. An almost continuous desert region may also be traced from the desert of North Africa through Arabia (which is largely occupied by bare deserts), Persia, and Beluchistan to the Indus.

Some of the largest rivers of Asia flow northward to the Arctic Ocean—the Obi, the Yenisei, and the Lena. The Hoang-Ho and Yang-tse, and the Amoor, are the chief of those which flow into the Pacific. The Ganges, Brahmaputra, Irawaddy, and Indus empty into the Indian Ocean. The Persian Gulf receives the united waters of the Euphrates and the Tigris. There are several systems of inland drainage, large rivers falling into lakes which have no outlet. The largest lake of Asia (partly



also European) is the Caspian Sea, which receives the Kur from the Caucasus (with its tributary the Aras from Armenia), and the Sefid Rud and other streams from Persia (besides the Volga from European Russia, and the Ural, which is partly European, partly Asiatic). The Caspian lies in the center of a great depression, being 83 feet below the level of the Sea of Azof. East from the Caspian is the Sea of Aral, which, like the Caspian, has no outlet, and is fed by the rivers Amoo Daria (Oxus) and Syr Daria. Still farther east, to the north of the Thian-Shan Mountains, and fed by the Ili and other streams, is Lake Balkash, also without an outlet, and very salt. Other lakes having no communication with the ocean are Lob Nor, in the desert of Gobi, receiving the river Tarim, and the Dead Sea, far below the level of the Mediterranean, and fed by the Jordan. The chief freshwater lake is Lake Baikal, in the south of Siberia, between lon. 104° and 110° e., a mountain lake from which the Yenisei draws a portion of its waters.

Active volcanoes are only met with in the extreme east (Kamchatka) and in the Eastern Archipelago. From the remotest times Asia has been celebrated for its mineral wealth. In the Altai and Ural Mountains gold, iron, lead, and platinum are found; in India and other parts rubies, diamonds, and other gems are, or have been, procured; salt in central Asia; coal in China, India, central Asia, etc.; petroleum in the districts about the Caspian and in Burmah; bitumen in Syria; while silver, copper, sulphur, etc., are found in various parts.

Every variety of climate may be experienced in Asia, but as a whole it is marked by extremes of heat and cold and by great dryness, this in particular being the case with vast regions in the center of the continent and distant from the sea.

The plants and animals of northern and western Asia generally resemble those of similar latitudes in Europe (which is really a prolongation of the Asiatic continent), differing more in species than in genera. The principal mountain trees are the pine, larch, and birch; the willow, alder, and poplar are found in lower grounds. In the central region European species reach as far as the western and central Himalayas, but are rare in the eastern. They are here met by Chinese and Japanese forms. The lower slopes of the Himalayas are clothed almost exclusively with tropical forms. Higher up, between 4000 and 10,000 feet, are found all the types of trees and plants that belong to the temperate zone, there being extensive forests of conifers. Here is the native home of the deodar cedar. The southeastern region, including India, the eastern Peninsula, and China, with the islands, contains a vast variety of plants useful to man and having here their original habitat, such as the sugarcane, rice, cotton, and indigo; pepper, cinnamon, cassia, clove, nutmeg, and cardamoms; banana, cocoanut, areca, and sago palms; the mango and many other fruits; with plants producing a vast number of drugs, caoutchouc, and gutta-percha. The forests of India and

the Malay Peninsula contain oak, teak, sâl, and other timber woods, besides bomboos, palms, sandalwood, etc. The palmyra palm is characteristic of Southern India; while the talipot palm flourishes on the western coast of Hindustan, Ceylon, and the Malay Peninsula. The cultivated plants of India and China include wheat, barley, rice, maize, millet, sorghum, tea, coffee, indigo, cotton, jute, opium, tobacco, etc. In north China and the Japanese Islands large numbers of deciduous trees occur, such as oaks, maples, limes, walnuts, poplars, and willows, the genera being European, but the individual species Asiatic. Among cultivated plants are wheat, and in favorable situations rice, cotton, the vine, etc. Coffee, rice, maize, etc., are extensively grown in some of the islands of the Asiatic Archipelago. In Arabia and the warmer valleys of Persia, Afghanistan, and Beluchistan, aromatic shrubs are abundant. Over large parts of these regions the date-palm flourishes and affords a valuable article of food. Gum-producing acacias are, with the date-palm, the commonest trees in Arabia. African forms are found extending from the Sahara along the desert region of Asia.

Nearly all the mammals of Europe occur in northern Asia, with numerous additions to the species. Central Asia is the native land of the horse, the ass, the ox, the sheep, and the goat. Both varieties of the camel, the single and the double humped, are Asiatic. To the inhabitants of Tibet and the higher plateaux of the Himalayas the yak is what the reindeer is to the tribes of the Siberian plain, almost their sole wealth and support. The elephant, of a different species from that of Africa, is a native of tropical Asia. The Asiatic lion, which inhabits Arabia, Persia, Asia Minor, Beluchistan, and some parts of India, is smaller than the African species. Bears are found in all parts, the white bear in the far north, and other species in the more temperate and tropical parts. The tiger is the most characteristic of the larger Asiatic Carnivora. It extends from Armenia across the entire continent, being absent, however, from the greater portion of Siberia and from the high tableland of Tibet; it extends also into Sumatra, Java, and Bali. In southeastern Asia and the islands we find the rhinoceros, buffalo, ox, deer, squirrels, porcupines, etc. In birds nearly every order is represented. Among the most interesting forms are the hornbills, the peacock, the Impey pheasant, the tragopan or horned pheasant, and other gallinaceous birds, the pheasant family being very characteristic of southeastern Asia. It was from Asia that the common domestic fowl was introduced into Europe. The tropical parts of Asia abound in monkeys, of which the species are numerous. Some are tailed, others, such as the orang, are tailless, but none have prehensile tails like the American monkeys. In the Malay Archipelago marsupial animals, so characteristic of Australia, first occur in the Moluccas and Celebes, while various mammals common in the western part of the Archipelago are absent. A similar transition toward

the Australian type takes place in the species of birds. Of marine mammals the dugong is peculiar to the Indian Ocean; in the Ganges is found a peculiar species of dolphin. At the head of the reptiles stands the Gangetic crocodile, frequenting the Ganges and other large rivers. Among the serpents are the cobra da capello, one of the most deadly snakes in existence; there are also large boas and pythons besides sea and freshwater snakes. The seas and rivers produce a great variety of fish. The Salmonidæ are found in the rivers flowing into the Arctic Ocean. Two rather remarkable fishes are the climbing perch and the archer-fish. The well-known goldfish is a native of China.

Asia is mainly peopled by races belonging to two great ethnographic types, the Caucasian or fair type, and the Mongolic or yellow. To the former belong the Aryan or Indo-European, and the Semitic races, both of which mainly inhabit the southwest of the continent; to the latter belong the Malays and Indo-Chinese in the s.e., as well as the Mongolians proper (Chinese, etc.), occupying nearly all the rest of the continent. To these may be added certain races of doubtful affinities, as the Dravidians of southern India, the Cingalese of Ceylon, the Ainos of Yesso, and some negro-like tribes called Negritos, which inhabit Malacca and the interior of several of the islands of the Eastern Archipelago. The total population is estimated at about 800,000,000, or more than half that of the whole world. The chief independent states are the Chinese Empire (pop. 360,250,000), Japan (pop. 40,000,000), Siam (pop. 6,000,000), Afghanistan (5,000,000), Beluchistan, Persia (pop. 7,000,000), and the Arabian states (3,000,000). The most important of the religions of Asia are the Brahmanism of India, the creeds of Buddha, Confucius, and Lao-tse in China, and the various forms of Mohammedanism in Arabia, Persia, India, etc. Probably more than a half of the whole population profess some form of Buddhism. Several native Christian sects are found in India, Armenia, Kurdistan, and Syria.

Asia is generally regarded as the cradle of the human race. It possesses the oldest historical documents, and next to the immediately contiguous kingdom of Egypt the oldest historical monuments in the world. At present the forms of government in Asia range from the primitive rule of the nomad sheik to the despotism of China. India has been brought by Britain directly under European influence, and Japan is freely modeling her institutions on those of the West.

ASIA, Central, a designation loosely given to the regions in the center of Asia east of the Caspian, also called Turkestan, and formerly Tartary. The eastern portion belongs to China, the western now to Russia. Russian Central Asia comprises the Kirghiz Steppe (Uralsk, Turgai, Akmolinsk, Semipalatinsk, etc.), and what is now the government-general of Turkestan, besides the territory of the Turkomans, or Transcaspia and Merv. Russia has thus absorbed the old khanate of Kho-













Hammond's 8 x 11 Map of Asia.  
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kand and part of Bokhara and Khiva, and controls the vassal territories of Bokhara and Khiva, the southern boundary being the Persian and Afghan frontiers.

**ASIA MINOR**, the most westerly portion of Asia, being the peninsula lying west of the Upper Euphrates, and forming part of Asiatic Turkey. It forms an extensive plateau, with lofty mountains rising above it, the most extensive ranges being the Taurus and Anti-Taurus, which border it on the south and southeast, and rise to over 10,000 feet. There are numerous salt and fresh-water lakes. The chief rivers are the Kizil-Irmak (Halys), Sakaria (Sangarius), entering the Black Sea; and the Sarabat (Hermus) and Menderes (Mæander), entering the Aegean. The coast regions are generally fertile, and have a genial climate; the interior is largely arid and dreary. Valuable forests and fruit-trees abound. Smyrna is the chief town. Anatolia is an equivalent name.

**ASP**, a species of viper found in Egypt, resembling the cobra da capello or spectacle-serpent of the East Indies, and having a very venomous bite.



Asp, from ancient Egyptian monument.

When approached or disturbed it elevates its head and body, swells out its neck, and appears to stand erect to attack the aggressor. Hence the ancient Egyptians believed that the asps were guardians of the spots they inhabited, and the figure of this reptile was adopted as an emblem of the protecting genius of the world.

**ASPAR'AGUS**, a plant, the young shoots of which, cut as they are emerging from the ground, are a favorite culinary vegetable. The plants should remain three years in the ground before they are cut; after which, for several years, they will continue to afford a regular annual supply. The beds are protected by straw or litter in winter. Its diuretic properties are ascribed to the presence of a crystalline substance found also in the potato, lettuce, etc.

**ASPA'SIA**, a celebrated lady of ancient Greece, was born at Miletus, in Ionia, but passed a great part of her life at Athens, where her house was the general resort of the most distinguished men in Greece. She won the affection of Pericles, who united himself to Aspasia as closely as was permitted by the Athenian law, which declared marriage with a foreign woman illegal. In 432-1 B.C. she was accused of impiety, and was only saved from condemnation by the eloquence and tears of Pericles. She had a son by Pericles,

who was legitimated (B.C. 430) by a special decree of the people.

**ASPHALT, ASPHAL'TUM**, the most common variety of bitumen; also called mineral pitch. Asphalt is a compact, glossy, brittle, black or brown mineral, which breaks with a polished fracture, melts easily with a strong pitchy odor when heated, and when pure burns without leaving any ashes. It is found in the earth in many parts of Asia, Europe, and America, and in a soft or liquid state on the surface of the Dead Sea, which from this circumstance was called Asphaltites. It is of organic origin, the asphalt of the great Pitch Lake of Trinidad being derived from bituminous shales, containing vegetable remains in the process of transformation. Asphalt is produced artificially in making coal-gas. During the process much tarry matter is evolved and collected in retorts. If this be distilled, naphtha and other volatile matters escape, and asphalt is left behind. It is sometimes called Jew's Pitch.

**ASPHYX'IA**, literally, the state of a living animal in which no pulsation can be perceived, but the term is more particularly applied to a suspension of the vital functions from causes hindering respiration. The normal accompaniments of death from asphyxia are dark fluid blood, a congested brain and exceedingly congested lungs, the general engorgement of the viscera, and an absence of blood from the left cavities of the heart while the right cavities and pulmonary artery are gorged. The restoration of asphyxiated persons has been successfully accomplished at long periods after apparent death. The attempt should be made to maintain the heat of the body and to secure the inflation of the lungs as in the case of the apparently drowned.

**AS'PINWALL**. See Colon.

**AS'PIRATE**, a name given to any sound like our h, to the letter h itself, or to any mark of aspiration.

**ASS**, a species of the horse genus, supposed by Darwin to have sprung from the wild variety found in Abyssinia, by some writers to be a descendant of the wild ass, inhabiting the mountainous deserts of Tartary, etc., and by others to have descended from the kiang of southwestern Asia. Both in color and size the ass is exceedingly variable, ranging from dark gray and reddish brown to white, and from the size of a Newfoundland dog in North India to that of a good-sized horse. In the southwestern countries of Asia and in Egypt, in some districts of southern Europe, as in Spain, and in Kentucky and Peru, great attention has been paid to selection and interbreeding, with a result no less remarkable than in the case of the horse. The male ass is mature at two years of age, the female still earlier. The she-ass carries her young eleven months. The teeth of the young ass follow the same order of appearance and renewal as those of the horse. The life of the ass does not usually exceed thirty years. It is in general much healthier than the horse, and is maintained in this condition by a smaller quantity and coarser quality of food; it is superior to the horse in its

ability to carry heavy burdens over the most precipitous roads, and is in no respect its inferior in intelligence, despite the reputation for stupidity which it has borne from very ancient times. The skin is used as parchment to cover drums, etc., and in the East is made into shagreen. The hybrid offspring of the horse and the female ass is the hinny, that of the ass and the mare is the mule; but the latter is by far the larger and more useful animal. Asses' milk, long celebrated for its sanative qualities, more closely resembles that of a woman, than any other. It is very similar in taste, and throws up an equally fluid cream, which is not convertible into butter.

**ASSAM'**, a chief commissionership or province of British India, on the northeast border of Bengal, bounded on the north by the Himalayas, on the east and south mainly by Burmah; area, 49,004 sq. miles. Pop. 6,126,343, 3,429,459 of whom are Hindus, 1,581,317 Moham-



Assamese.

medans, 35,969 Christians, 8911 Buddhists, the rest being chiefly hill tribes of aboriginal faiths.

**AS'SAPAN**, the flying-squirrel of N. America, an elegant little animal with folds of skin along its sides which enable it to take leaps of 40 or 50 yards.

**ASSASSINA'TION**, an act by which life is taken in a treacherous or unexpected manner, usually for the furtherance of a political or social purpose. The term is not customarily applied to murder accomplished for purely personal reasons in the manner of assassination, but rather to the murder of some public official or important person. The term "spadassin," used during the French revolution, is of kindred origin and meaning.

**ASSASS'INS**, an Asiatic order or society having the practice of assassination as its most distinctive feature, founded by Hassan Ben Sabbah, a dai or missionary of the heterodox Mohammedan sect the Ismaelites.

**ASSAULT AND BATTERY**, in law, an attempt or offer, with force and violence, to do a corporal hurt to another, as by striking at him with or without a weapon. If a person lift up or stretch forth his arm and offer to strike another, or menace any one with any staff or weapon, it is an assault in law. Assault, therefore, does not necessarily imply a hitting or blow,



because in trespass for assault and battery a man may be found guilty of the assault and acquitted of the battery. But every battery includes an assault.

**ASSAYING**, the estimation of the amount of pure metal, and especially of the precious metals, in an ore or alloy. In the case of silver the assay is either by the dry or by the wet process. The dry process is called cupellation from the use of a small and very porous cup, called a cupel, formed of well-burned and finely-ground bone-ash made into a paste with water. The cupel, being thoroughly dried, is placed in a fire-clay oven about the size of a drain-tile, with a flat sole and arched roof, and with slits at the sides to admit air. This oven, called a muffle, is set in a furnace, and when it is at a red heat the assay, consisting of a small weighed portion of the alloy wrapped in sheet-lead, is laid upon the cupel. The heat causes the lead to volatilize or combine with the other metals, and to sink with them into the cupel, leaving a bright globule of pure metallic silver, which gives the amount of silver in the alloy operated on. In the wet process the alloy is dissolved in nitric acid, and to the solution are added measured quantities of a solution of common salt of known strength, which precipitates chloride of silver. The operation is concluded when no further precipitate is obtained on the addition of the salt solution, and the quantity of silver is calculated from the amount of salt solution used. An alloy of gold is first cupelled with lead as above, with the addition of three parts of silver for every one of gold. After the cupellation is finished the alloy of gold and silver is beaten and rolled out into a thin plate, which is curled up by the fingers into a little spiral or cornet. This is put into a flask with nitric acid, which dissolves away the silver and leaves the cornet dark and brittle. After washing with water the cornet is boiled with stronger nitric acid to remove the last traces of silver, well washed, and then allowed to drop into a small crucible, in which it is heated, and then it is weighed. The assay of gold, therefore, consists of two parts: cupellation, by which inferior metals (except silver) are removed; and quartation, by which the added silver and any silver originally present are got rid of. The quantity of silver added has to be regulated to about three times that of the gold. If it be more the cornet breaks up, if it be less the gold protects small quantities of the silver from the action of the acid. Where, as in some gold manufactured articles, these methods of assay cannot be applied, a streak is drawn with the article upon a touchstone consisting of coarse-grained Lydian quartz saturated with bituminous matter, or of black basalt. The practiced assayer will detect approximately the richness of the gold from the color of the streak, which may be further subjected to an acid test.

**ASSAY OFFICE**, a laboratory conducted by the United States government for the valuation of gold and silver deposited for coinage. The principal mints have assay offices attached to them, and there is an assay office at

Seattle, Wash. The largest in the country is that at New York.

**AS'SEGAI**, a spear used as a weapon among the Kaffirs of S. Africa, made of hard wood tipped with iron, and used for throwing or thrusting.

**ASSESS'OR**, a person appointed to ascertain and fix the amount of taxes, rates, etc.; or a person who sits along with the judges in certain courts, and assists them with his professional knowledge.

**AS'SETS**, property or goods available for the payment of a bankrupt or deceased person's obligations. Assets are personal or real, the former comprising all goods, chattels, etc., devolving upon the executor as saleable to discharge debts and legacies. In commerce and bankruptcy the term is often used as the antithesis of "liabilities," to designate the stock in trade and entire property of an individual or an association.

**ASSIGNEE'**, a person appointed by another to transact some business, or exercise some particular privilege or power. Formerly the persons appointed under a commission of bankruptcy, to manage the estate of the bankrupt on behalf of the creditors, were so called, but now trustees.

**ASSIGNMENT** is a transfer by deed of any property, or right, title, or interest, in property, real or personal. Assignments are usually given for leases, mortgages, and funded property.

**ASSINIBOI'A**, the smallest of the four districts into which a portion of the northwestern territories of Canada was divided in 1882. It lies immediately to the west of Manitoba, with Saskatchewan and Alberta as its northern and western boundaries. It is intersected by the Saskatchewan (south branch) and the Qu'Appelle river, and contains much good wheat land. Some coal is mined. Area, 89,535 sq. miles. Pop. 67,385. Capital, Regina, on the Canadian Pacific Railway, which intersects the district.

**ASSINIBOINE**, a river of Canada, which flows through Manitoba and joins the Red river at Winnipeg, about 40 miles above the entrance of the latter into Lake Winnipeg, after a somewhat circuitous course of about 500 miles from the west and northwest. Steamers ply on it for over 300 miles.

**ASSOCIATION OF IDEAS**, the term used in psychology to comprise the conditions under which one idea is able to recall another to consciousness. Psychologists have been disposed to classify these conditions under two general heads: the law of contiguity, and the law of association. The first states the fact that actions, sensations, emotions, and ideas, which have occurred together, or in close succession, tend to suggest each other when any one of them is afterward presented to the mind. The second indicates that present actions, sensations, emotions, or ideas tend to recall their like from among previous experiences. Other laws have at times been enunciated, but they are reducible to these; thus, the "law of contrast or contrariety" is properly a case of contiguity. On their physical side the principles of association correspond with the physiological facts of re-

excitation of the same nervous centers, and in this respect they have played an important part in the endeavor to place psychology upon a basis of positive science. The laws of association, taken in connection with the law of relativity, are held by many to be a complete exposition of the phenomena of intellect.

**ASSUMP'SIT**, in English law, an action to recover compensation for the non-performance of a parole promise; that is, a promise not contained in a deed under seal. Assumpsits are of two kinds, express and implied. The former are where the contracts are actually made in word or writing; the latter are such as the law implies from the justice of the case; e.g. employment to do work implies a promise to pay.

**ASSUMPTION**, the ecclesiastical festival celebrating the miraculous ascent into heaven of the Virgin Mary's body as well as her soul, kept on the 15th of August. The legend first appeared in the 3d or 4th century, and the festival was instituted some three centuries later.

**ASSURANCE**. See Insurance.

**ASSYR'IA**, an ancient monarchy in Asia, intersected by the upper course of the Tigris, and having the Armenian mountains on the north and Babylonia on the south; area, probably about 100,000 sq. miles; surface partly mountainous, hilly, or undulating, partly a portion of the fertile Mesopotamian



Assyrian soldiers.

plain. The numerous remains of ancient habitations show how thickly this vast flat must have once been peopled; now, for the most part, it is a mere wilderness. The chief cities of Assyria in the days of its prosperity were Nineveh, the site of which is marked by mounds opposite Mosul (Nebi Yunus and Koyunjik), Calah or Kalakl (the modern Nimrud), Asshur or Al Asur (Kalah Sherghat), Sargina (Khorsabad), and Arbela (Arbil).

Much light has been thrown on the history of Assyria by the decipherment of the cuneiform inscriptions obtained by excavation. About 1120 B.C. Tiglath-Pileser I., one of the greatest of the sovereigns of the first Assyrian monarchy, ascended the throne, and carried his conquests to the Mediterranean on the one side and to the Caspian and the Persian Gulf on the other. At his death there ensued a period of decline, which lasted over 200 years. Under Assurnazir-pal, who reigned from 884 to 859



B.C., Assyria once more advanced to the position of the leading power in the world, the extent of his kingdom being greater than that of Tiglath-Pileser. The magnificent palaces, temples, and other buildings of his reign prove the advance of the nation in wealth, art, and luxury. In 859 he was succeeded by his son Shalmaneser II., whose career of conquest was equally successful. Sargon (722-705), a usurper, claimed descent from the ancient Assyrian kings. After taking Samaria and leading over 27,000 people captive, he overthrew the combined forces of Elam (Susiana) and Babylon. He defeated the King of Hamath, who along with other princes had revolted, took him prisoner, and flayed him alive, advanced through Philistia and captured Ashdod; then pushing southward totally defeated the forces of Egypt and Gaza at Raphia (719). The revolted Armenians had also more than once to be put down. In 710 Merodach-baladan was driven out of Babylonia by Sargon, after holding it for twelve years as an independent king, and being supported by the rulers of Egypt and Palestine; his allies were also crushed, Judah was overrun, and Ashdod leveled to the ground. Sargon latterly crossed over and took Cyprus, where he left an inscription telling of his expedition.

and Arabia. Egypt was the only power, however, which regained its independence; fire, sword, and famine reduced the rest to submission. In 640 the Medes revolted, and latterly made themselves independent. Though the king's character was marked by cruelty and sensuality, he was a zealous patron of the arts and learning. He died in 625, and was succeeded by his son Assur-emid-ilin (or Sarakos), under whom Babylon definitely threw off the Assyrian yoke. The country continued rapidly to decline, fighting hard for existence until the capital Nineveh was captured and burned by the allied forces of the Medes and Babylonians, about 607 or 606 B.C. The story of Sardanapalus associated with this event is a mere myth or legend. Assyria now fell partly to Media, partly to Babylonia, and afterwards formed with Babylonia one of the satrapies of the Persian empire. In 312 B.C. it became part of the kingdom of the Seleucidæ; later on it came under Parthian rule, and was more than once a Roman possession. For a long period it was under the caliphs of Bagdad. In 1638 the Turks wrested it from the Persians, and it has continued under their dominion since that date.

The Assyrians were far advanced in art and industry, and in civilization in



Hunting wild bull, from monuments at Nineveh.

He spent the latter years of his reign in internal reforms, in the midst of which he was murdered, being succeeded by Sennacherib, one of his younger sons, in 705. Sennacherib at once had to take up arms against Merodach-baladan, who had again obtained possession of Babylon. In 701 fresh outbreaks in Syria led him in that direction. He captured Zidon and Askelon, and defeated Hezekiah and his Egyptian and Ethiopian allies, and forced him to pay tribute, after which he returned to Assyria to overawe the Babylonians, Elamites, and the northern hill tribes. A second expedition into Syria is briefly recorded in 2 Kings xix., where we are told that, as his army lay before Libnah, in one night the angel of Jehovah went out, and smote in the camp of the Assyrians 185,000 men (2 Kings xix. 35). In 681 he was murdered by his two sons, Adrammelech and Sharezer, but they were defeated by their brother Esar-haddon, who then mounted the throne. In 652 a general insurrection broke out, headed by Sammughes, governor of Babylonia, Assur-bani-pal's own brother, and including Babylonia, Egypt, Palestine,

general. They constructed large buildings, especially palaces, of a most imposing character, the materials being brick, burned or sun-dried, stone, alabaster slabs for lining and adorning the walls internally and externally, and timber for pillars and roofs. These alabaster slabs were elaborately sculptured with designs serving to throw much light on the manners and customs of the people. A most characteristic feature of the palaces were gigantic figures of winged, human-headed bulls, placed at gateways (often arched over) or other important points; figures of lions, etc., were also similarly employed. The palaces were raised on high terraces, and often comprised a great number of apartments; there were no windows, light being obtained by carrying the walls up to a certain height and then raising on them pillars to support the roof and admit light and air. The cities of Nineveh, Assur, and Arbela had each their royal observatories, superintended by astronomers-royal, who had to send in their reports to the king twice a month. At an early date the stars were numbered and named; a calendar was formed, in which the year was divided

into twelve months (of thirty days each), called after the zodiacal signs, but as this division was found to be inaccurate an intercalary month was added every six years. The week was divided into seven days, the seventh being a day of rest; the day was divided into twelve periods of two hours each, each of these being subdivided into sixty minutes, and these again into sixty seconds. The Assyrians employed both the dial and the clepsydra. Eclipses were recorded from a very remote epoch, and their recurrence roughly determined. The principal astronomical work, called the Illumination of Bel, was inscribed on seventy tablets, and went through numerous editions, one of the latest being in the British Museum. It treats among other things of comets, the polar star, the conjunction of the sun and moon, and the motions of Venus and Mars.

**ASTARTE**, a Syrian goddess, probably corresponding to the Semële of the Greeks and the Ashtaroth of the Hebrews, and representing the productive power of nature. She was a moon-goddess. Some regard her as corresponding with Hera (Juno), and others with Aphrodītē. See Ashtaroth.

**ASTER**, a genus of plants, comprehending several hundred species, mostly natives of North America, although others are widely distributed. Many are cultivated as ornamental plants. Asters generally flower late in the season, and some are hence called Michaelmas or Christmas Daisies. The China Aster is a very showy annual, of which there are many varieties.

**ASTERIA**, a name applied to a variety of corundum, which displays an opalescent star of six rays of light when cut with certain precautions; and also to the cat's-eye, which consists of quartz, and is found especially in Ceylon.

**ASTERISK**, the figure of a star, thus \*, used in printing and writing, as a reference to a passage or note in the margin, or to fill the space when a name, or the like, is omitted.

**ASTEROIDS**, or **PLANETOIDS**, a numerous group of very small planets revolving round the sun between the orbits of Mars and Jupiter, remarkable for the eccentricity of their orbits and the large size of their angle of inclination to the ecliptic. The diameter of the largest is not supposed to exceed 450 miles, while most of the others are very much smaller. They number over 400, and new members are being constantly discovered. Ceres, the first of them, was discovered 1st January, 1801, and within three years more Pallas, Juno, and Vesta were seen. The extraordinary smallness of these bodies, and their nearness to each other, gave rise to the opinion that they were but the fragments of a planet that had formerly existed and had been brought to an end by some catastrophe. For nearly forty years investigations were carried on, but no more planets were discovered till 8th December, 1845, when a fifth planet in the same region was discovered. The rapid succession of discoveries that followed was for a time taken as a corroboration of the disruptive theory, but the breadth of the



zone occupied makes the hypothesis of a shattered planet more than doubtful. Their mean distances from the sun vary between 200,000,000 and 300,000,000 miles; the periods of revolution between 1191 days (Flora) and 2868 (Hilda). Their eccentricities and inclinations are on the average greater than those of the earth, but their total mass does not exceed one-fourth that of the earth.

**ASTHMA** (ast'má), difficulty of respiration, returning at intervals, with a sense of stricture across the chest and in the lungs, a wheezing, hard cough at first, but more free toward the close of each paroxysm, with a discharge of mucus, followed by a remission. Asthma is essentially a spasm of the muscular tissue which is contained in the smaller bronchial tubes. It generally attacks persons advanced in years, and seems, in some instances, to be hereditary. The exciting causes are various—accumulation of blood or viscid mucus in the lungs, noxious vapors, a cold and foggy atmosphere, or a close, hot air, flatulence, accumulated feces, violent passions, organic diseases in the thoracic viscera, etc. By far the most important part of the treatment consists in the obviating or removing the several exciting causes. It seldom proves fatal except as inducing dropsy, consumption, etc.

**ASTIGMATISM**, a malformation, congenital or accidental, of the lens of the eye, in consequence of which the individual does not see objects in the same plane, although they may really be so. It is due to the degree of convexity of the horizontal and vertical meridians being different, so that corresponding rays, instead of converging into one point, meet at two foci.



**ASTOR**, John Jacob, born near Heidelberg, Germany, 1763; died at New York 1848. In 1783 he emigrated to the United States, settled at New York, and became extensively engaged in the fur trade. In 1811 the settlement of Astoria, founded by him, near the mouth of the Columbia river, was formed to serve as a central depot for the fur trade between the lakes and the

Pacific. He subsequently engaged in various speculations, and died worth \$30,000,000, leaving \$350,000 to found the Astor Library in New York. This institution is contained in a splendid building, enlarged in 1859 at the cost of his son, and comprises about 260,000 volumes.

**ASTOR**, John Jacob, an American millionaire, and fourth of that name. Born in New York in 1864. Died 1890.

**ASTOR**, William Waldorf, a famous millionaire, born in New York in 1848, and great-grandson of the first John Jacob Astor. Defeated as a candidate for congress in 1881, he was American minister to Italy from 1882 to 1885. In 1890 he removed to England and became a British subject. His income is derived from a fortune of \$200,000,000 in the United States.

**ASTRAKHAN** (às-trá-hàn'), a Russian city, capital of government of same name, on an elevated island in the Volga, about 30 miles above its mouth in the Caspian, communicating with the opposite banks of the river by numerous bridges. Pop. 113,001, composed of various races.—The government has an area of 85,000 square miles. It consists almost entirely of two vast steppes, separated from each other by the Volga, and forming for the most part arid sterile deserts. Pop. 994,775.

**ASTRAKHAN**, a name given to sheepskins with a curled woolly surface obtained from a variety of sheep found in Bokhara, Persia, and Syria; also a rough fabric with a pile in imitation of this.

**ASTRAL SPIRITS**, spirits formerly believed to people the heavenly bodies or the aerial regions. In the middle ages they were variously conceived as fallen angels, souls of departed men, or spirits originating in fire, and belonging neither to heaven, earth, nor hell. Paracelsus regarded them as demoniacal in character.

**ASTRIN'GENT**, a medicine which contracts the organic textures and canals of the body, thereby checking or diminishing excessive discharges. The chief astringents are the mineral acids, alum, lime-water, chalk, salts of copper, zinc, iron, lead, silver; and among vegetables catechu, kino, oak-bark, and galls.

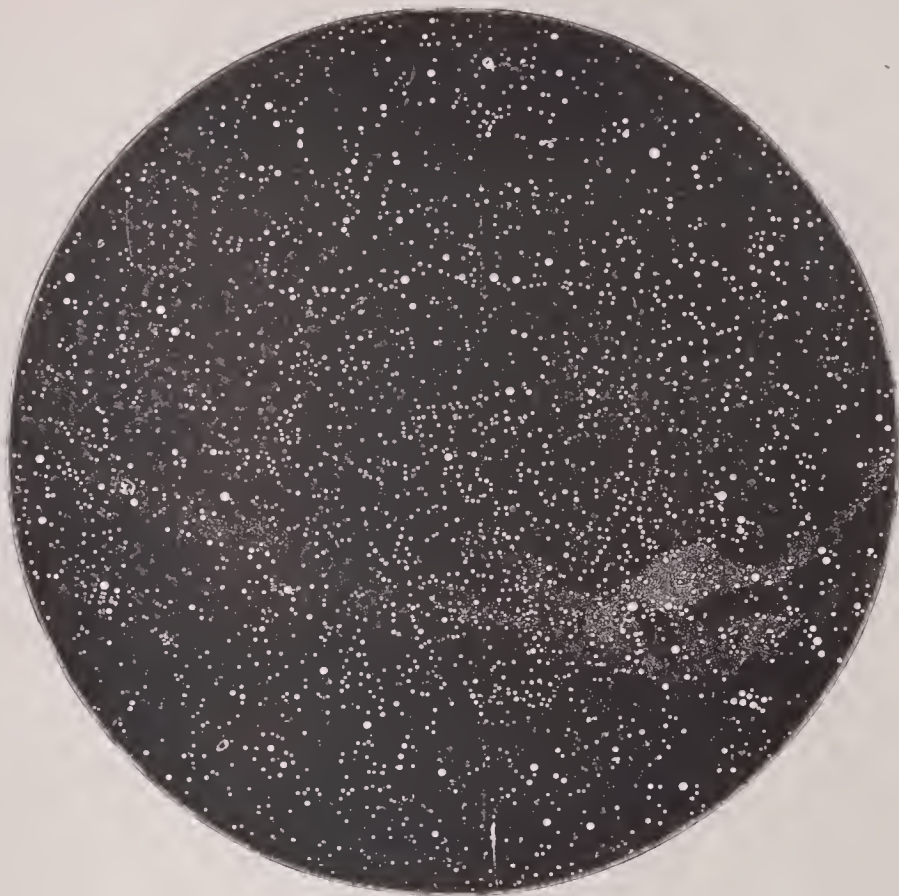
**ASTROL'OGY**, literally, the science or doctrine of the stars. The name was formerly used as equivalent to astronomy, but is now restricted in meaning to the pseudo-science which pretends to enable men to judge of the effects and influences of the heavenly bodies on human and other mundane affairs, and to foretell future events by their situations and conjunctions. As usually practiced the whole heavens, visible and invisible, was divided by great circles into twelve equal parts, called houses. As the circles were supposed to remain immovable every heavenly body passed through each of the twelve houses every twenty-four hours. The portion of the zodiac contained in each house was the part to which chief attention was paid, and the position of any planet was settled by its distance from the boundary circle of the house, measured on the ecliptic. The houses had different names and different powers, the first being called

the house of life, the second the house of riches, the third of brethren, the sixth of marriage, the eighth of death, and so on. The part of the heavens about to rise was called the ascendant, the planet within the house of the ascendant being the lord of the ascendant. The different aspects of the planets were of great importance. To cast a person's nativity (or draw his horoscope) was to find the position of the heavens at the instant of his birth, which being done the astrologer, who knew the various powers and influences possessed by the sun, the moon, and the planets, could predict what the course and termination of that person's life would be. The temperament of the individual was ascribed to the planet under which he was born, as saturnine from Saturn, jovial from Jupiter, mercurial from Mercury, etc.—words which are now used with little thought of their original meaning. The virtues of herbs, gems, and medicines were supposed to be due to their ruling planets.

**ASTRON'OMY** is that science which investigates the motions, distances, magnitudes, and various phenomena of the heavenly bodies. That part of the science which gives a description of the motions, figures, periods of revolution, and other phenomena of the heavenly bodies is called descriptive astronomy; that part which teaches how to observe the motions, figures, periodical revolutions, distances, etc., of the heavenly bodies, and how to use the necessary instruments, is called practical astronomy; and that part which explains the causes of their motions, and demonstrates the laws by which those causes operate, is termed physical astronomy. Recent years have added two new fields of investigation which are full of promise for the advancement of astronomical science. The first of these—celestial photography—has furnished us with invaluable light-pictures of the sun, moon, and other bodies, and has recorded the existence of myriads of stars invisible even by the best telescopes; while the second, spectrum analysis, now at work in many hands, reveals to us a knowledge of the physical constituents of the universe, telling us for instance that in the sun (or his atmosphere) there exist many of the elements familiar to us on the earth. It has also been applied to the determination of the velocity with which stars are approaching to, or receding from, our system; and to the measurement of movements taking place within the solar atmospheric envelopes. From analysis of some of the unresolved nebulae the inference is drawn that they are not star-swarms but simply cosmical vapor; whence a second inference results favorable to the hypothesis of the gradual condensation of nebulae, and the successive evolutions of suns and systems.

The most remote period to which we can go back in tracing the history of astronomy refers us to a time about 2500 B.C., when the Chinese are said to have recorded the simultaneous conjunction of Saturn, Jupiter, Mars, and Mercury with the moon. The Arabs began to make scientific astronomical





I.--NORTHERN HEMISPHERE.



II.—SOUTHERN HEMISPHERE.

Equal-surface projection of the celestial sphere, showing all the stars visible to the naked eye.









Total Eclipse of the Sun.  
Observed at Creston, Wyo.,  
July 29, 1878.



Great Nebula in Orion.  
From a Study made in  
Years 1876-1878.



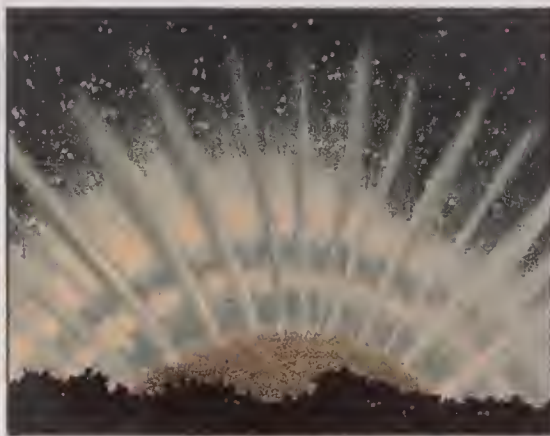
The Planet Mars. Observed  
Sept. 3, 1877 at 11:55 P. M.



Solar Protuberances. 126,000 Miles  
High Observed May 6, 1878.



The Planet Saturn.  
Observed Nov. 30, 1874,  
at 5:50 P. M.



Aurora Borealis.  
Observed March 1, 1872,  
at 9:25 P. M.

## ASTRONOMICAL PHENOMENA.







observations about the middle of the 8th century, and for 400 years they prosecuted the science with assiduity. Ibn-Yunis (1000 A.D.) made important observations of the disturbances and eccentricities of Jupiter and Saturn. In the 16th century Nicholas Copernicus, born in 1473, introduced the system that bears his name, and which gives to the sun the central place in the solar system, and shows all the other bodies, the earth included, revolving around him. This arrangement of the universe (see Copernicus) came at length to be generally received on account of the simplicity it substituted for the complexities and contradictions of the theory of Ptolemy. The observations and calculations of Tycho Brahe, a Danish astronomer, born in 1546, continued over many years, were of the highest value, and claim for him the title of regenerator of practical astronomy. His assistant and pupil, Kepler, born in 1571, was enabled, principally by the aid he received from his master's labors, to arrive at those laws which have made his name famous: 1. That the planets move, not in circular, but in elliptical orbits, of which the sun occupies a focus. 2. That the radius vector, or imaginary straight line joining the sun and any planet, moves over equal spaces in equal times. 3. That the squares of the times of the revolutions of the planets are as the cubes of their mean distances from the sun. Galileo, who died in 1642, advanced the science by his observations and by the new revelations he made through his telescopes, which established the truth of the Copernican theory. Newton, born in 1642, carried physical astronomy suddenly to comparative perfection. The splendid analytical researches of Lalande, Lagrange, Delambre, and Laplace, mark the same period. The 19th century opened with the discovery of the first four minor planets; and the existence of another planet (Neptune), more distant from the sun than Uranus, was, in 1845, simultaneously and independently predicted by Leverrier and Adams. Of late years the sun has attracted a number of observers, the spectroscope and photography having been especially fruitful in this field of investigation. From recent transit observations the former calculated distance of the sun has been corrected, and is now given as 92,560,000 miles. An interesting recent discovery is that of the two satellites of Mars. The existence of an intra-Mercurial planet, which has been named Vulcan, has not yet been verified. Much valuable work has of late been accomplished in ascertaining the parallax of fixed stars.

The objects with which astronomy has chiefly to deal are the earth, the sun, the moon, the planets, the fixed stars, comets, nebulae, and meteors. The stellar universe is composed of an unknown host of stars, many millions in number, the most noticeable of which have been formed into groups called constellations. The nebulae are cloud-like patches of light scattered all over the heavens. Some of them have been resolved into star-clusters, but many of

them are but masses of incandescent gas. The observation of meteors has recently attracted much attention. They most frequently occur in the autumn, and have been supposed to be the debris of comets. See articles Earth, Sun, Moon, Planet, Comet, Stars, Mercury, Venus, Mars, Jupiter, Saturn, Asteroids, etc.

**ASTRO-PHOTOGRAPHY**, the art of photographing heavenly bodies. It has been particularly useful in bringing out nebulae, stars, star-clusters, and other bodies of that kind which remain invisible in the most powerful telescopes. Several important discoveries have been made by the use of the camera. Among these may be mentioned the planet Eros, the earth's nearest neighbor (excepting the moon), and a number of comets. Various large observatories in all countries are now engaged in making a complete atlas of all the stars down to the 11th magnitude by means of the photographic camera.

**AS'WAIL**, the native name for the sloth-bear of the mountains of India, an uncouth, unwieldy animal, with very long black hair, inoffensive when not attacked.

**ASY'LUM**, a sanctuary or place of refuge, where criminals and debtors sheltered themselves from justice, and from which they could not be taken without sacrilege. Temples were anciently asylums, as were Christian churches in later times. (See Sanctuary.) The term is now usually applied to an institution for receiving, maintaining, and, so far as possible, ameliorating the condition of persons laboring under certain bodily defects or mental maladies; sometimes also a refuge for the unfortunate.

**ATACAMA** (á-tá-ká'má), a desert region on the west coast of S. America belonging to Chile, comprised partly in the province of Atacama, partly in the territory of Antofagasta. It forms the chief mining district of Chile, there being here rich silver mines, while gold is also found, as well as argentiferous lead, copper, nickel, cobalt, and iron; with guano on the coast. The northern portion till recently belonged to Bolivia. The Chilean province of Atacama has an area of 39,000 sq. miles and a pop. of 84,000.

**ATACA'MITE**, a mineral consisting of a combination of the protoxide and chloride of copper, occurring abundantly in some parts of South America, as at Atacama, whence it has its name. It is worked as an ore in South America, and is exported to the United States.

**ATALAN'TA**, in the Greek mythology, a famous huntress of Arcadia. She was to be obtained in marriage only by him who could outstrip her in a race, the consequence of failure being death. One of her suitors obtained from Aphroditê (Venus) three golden apples, which he threw behind him, one after another, as he ran. Atalanta stopped to pick them up, and was not unwillingly defeated. There was another Atalanta belonging to Boeotia, who cannot very well be distinguished, the same stories being told about both.

**AT'AVISM**, in biology, the tendency to reproduce the ancestral type in animals

or plants which have become considerably modified by breeding or cultivation; the reversion of a descendant to some peculiarity of a more or less remote ancestor.

**ATAXY, ATAXIA**, in medicine, irregularity in the animal functions, or in the symptoms of a disease. See Locomotor ataxia.

**ATCH'ISON**, a city of Kansas, on the Missouri river, about 30 miles from Leavenworth, an important railway center, with an increasing trade. Pop. 18,785.

**ATHABAS'CA**, a river, lake, and district of Canada. The Athabasca river rises on the eastern slopes of the Rocky Mountains in the district of Alberta, flows in a n.e. direction through the district of the same name, and falls into Lake Athabasca after a course of about 600 miles.—Lake Athabasca, or Lake of the Hills, is about 190 miles s.s.e. of the Great Slave Lake, with which it is connected by means of the Slave river, a continuation of the Peace. It is about 200 miles in length from east to west, and about 35 miles wide at the broadest part, but gradually narrows to a point at either extremity.—The district of Athabasca, formed in 1882, lies immediately e. of British Columbia and n. of Alberta; area about 251,300 sq. miles. It is intersected by the Athabasca and the Peace river, and as yet has a scanty population. The name is also given to a family of Indians.

**A'THEISM**, the disbelief of the existence of a God or supreme intelligent being; the doctrine opposed to theism or deism. The term has been often loosely used as equivalent with infidelity generally, with deism, with pantheism, and with the denial of immortality.

**ATH'ELING**, a title of honor among the Anglo-Saxons, meaning one who is of noble blood. The title was gradually confined to the princes of the blood royal, and in the 9th and 10th centuries is used exclusively for the sons or brothers of the reigning king.

**ATHE'NA, or ATHENE**, a Greek goddess, identified by the Romans with Minerva, the representative of the intellectual powers; the daughter of Zeus (Jupiter) and Mêtis (that is, wisdom or cleverness). According to the legend, which is perhaps allegorical, before her birth Zeus swallowed her mother, and Athena afterwards sprang from the head of Zeus with a mighty war shout and in complete armor. In her character of a wise and prudent warrior she was contrasted with the fierce Ares (Mars). In the wars of the giants she slew Pallas and Enceladus. She is also represented as the patroness of the arts of peace. The sculptor, the architect, and the painter, as well as the philosopher, the orator, and the poet, considered her their tutelary deity. She is also represented among the healing gods. In all these representations she is the symbol of the thinking faculty, the goddess of wisdom, science, and art. As a warrior she is represented completely armed, her head covered with a gold helmet. As the goddess of peaceful arts she appears in the dress of a Grecian matron. All Attica, but particularly

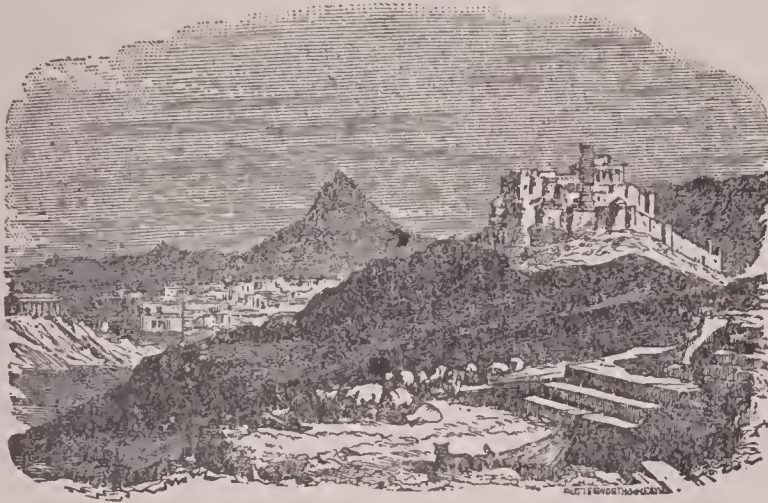


Athens, was sacred to her, and she had numerous temples there.

**ATHENÆUM**, the temple of Athena or Minerva, at Athens, frequented by poets, learned men, and orators. In modern times the same name is given to literary clubs and establishments connected with the sciences.

**ATH'ENS**, anciently the capital of Attica and center of Greek culture, now the capital of the Kingdom of Greece.

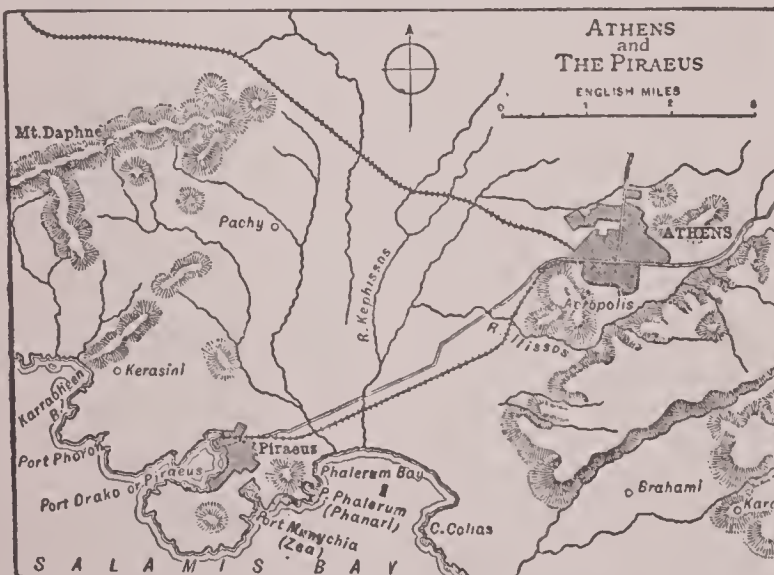
the aid of the architects Ictinus and Mnesicles and of the sculptor Phidias the Acropolis was perfected. Covering the whole of the western end rose the Propylæa, of Pentelic marble and consisting of a central portico with two wings in the form of Doric temples. Within, to the left of the entrance, stood the bronze statue of Athena Promachus, and beyond it the Erechtheum, containing the statue of Athena



Athens—The Acropolis and Areopagus.

It is situated in the central plain of Attica, about 4 miles from the Saronic Gulf or Gulf of Ægina, an arm of the Ægean Sea running in between the mainland and the Peloponnesus. It is said to have been founded about 1550 B.C. by Cecrops, the mythical Pelasgian hero, and to have borne the name Cecropia until under Erechtheus it received the name of Athens in honor of Athēnē. The Acropolis, an irregular

Polias; while to the right, on the highest part of the Acropolis, was the marble Parthenon or temple of Athena, the crowning glory of the whole. About 420 A.D. paganism was totally annihilated at Athens, and when Justinian closed even the schools of the philosophers, the reverence for buildings associated with the names of the ancient deities and heroes was lost. The Parthenon was turned into a church of the



oval crag 150 ft. high, with a level summit 1000 feet long by 500 in breadth, was the original nucleus of the city, which according to tradition was extended by Theseus when Athens became the head of the confederate Attic states. Under Pericles the highest point of artistic development was reached. An Odeum was erected on the east of the Dionysiae theater for the recitations of rhapsodists and musicians; and with

Virgin Mary, and St. George stepped into the place of Theseus. Finally, in 1456, the place fell into the hands of the Turks. The Parthenon became a mosque, and in 1687 was greatly damaged by an explosion at the siege of Athens by the Venetians. Enough, however, remains of it and of the neighboring structures to abundantly attest the splendor of the Acropolis; while of the other buildings of the city the Theseum

and Horologium, or Temple of the Winds, are admirably preserved, as also are the Pnyx, Panathenaic stadium, etc. Soon after the commencement of the war of liberation in 1821 the Turks surrendered Athens, but captured it again in 1826-27. It was then abandoned until 1830. In 1835 it became the royal residence, and made rapid progress. The modern city mostly lies northward and eastward from the Acropolis, and consists mainly of straight and well-built streets. Among the principal buildings are the royal palace, a stately building with a façade of Pentelic marble (completed 1843), the university, the academy, public library, theater, and observatory. The university was opened in 1836, and has 3000 students. There are valuable museums, in particular the National Museum and that in the Polytechnic School, which embraces the Schliemann collection, etc. These are constantly being added to by excavations. There are four foreign archaeological schools or institutes, the French, German, American, and British. Tramways have been made in the principal streets, and the city is connected by railway (6 miles) with its port, the Piræus. Pop. 128,735.

**ATHENS**, the name of many places in the U. States, the chief being in Georgia, and containing the Georgia University. Pop. 10,245.

**ATHERTON**, Gertrude Franklin, an American novelist born in California in 1859. She is the author of several novels, among which *The Aristocrats*, *The Conqueror*, *American Wives* and *English Husbands*, and Senator North are popular in America and England. She removed to England in 1895.

**ATHLETES** (ath'lēts), combatants who took part in the public games of Greece. The profession was an honorable one; tests of birth, position, and character were imposed, and crowns, statues, special privileges, and pensions were among the rewards of success. Athletic sports, if they do not hold such an honorable position today as they did in antiquity, are still practiced with great enthusiasm and excite the keenest interest in their patrons. Among them are running, jumping, rowing, swimming, baseball, cricket, football, wrestling, throwing the hammer, "putting" the shot, etc.

**ATKINSON**, Edward, an American economist, born in Massachusetts in 1827. He was for many years engaged in business, and meanwhile was a hard student of various sciences. He is the author of several works on economic subjects and of *The Science of Nutrition*, which has run through several editions.

**ATKINSON**, George Francis, an American botanist and educator, born in Michigan in 1854. He filled several chairs in various institutions till 1892, when he became professor of botany at Cornell University.

**ATLAN'TA**, a city in the United States, capital of Georgia, on an elevated ridge, 7 miles southeast of the Chattahoochee river. It is an important railway center; carries on a large trade in grain, paper, cotton, flour, and especially tobacco, and possesses flour-mills, paper-



mills, iron-works, etc. Here are Atlanta University for colored male and female students, a theological college, a medical



State capitol, Atlanta, Ga.

college, etc. Atlanta suffered severely during the civil war. Pop. 150,000.

**ATLANTIC CITY**, a fashionable watering-place on the coast of New Jersey. Pop. 27,838. During the summer the transient population varies between 250,000 and 300,000.

**ATLANTIC OCEAN**, the vast expanse of sea lying between the west coasts of Europe and Africa and the east coasts of North and South America, and extending from the Arctic to the Antarctic Ocean; greatest breadth, between the west coast of northern Africa and the east coast of Florida, 4150 miles; least breadth, between Norway and Greenland, 930 miles; superficial extent, 25,000,000 square miles. The principal inlets and bays are Baffin's and Hudson's Bays, the Gulf of Mexico, the Caribbean Sea, the North Sea or German Ocean, the Bay of Biscay, and the Gulf of Guinea. The principal islands north of the equator are Iceland, the Faroe and British Islands, the Azores, Canaries, and Cape de Verd Islands, Newfoundland, Cape Breton, and the West India Islands; and, south of the equator, Ascension, St. Helena, and Tristan da Cunha.

The great currents of the Atlantic are the Equatorial Current (divisible into the Main, Northern, and Southern Equatorial Currents), the Gulf-stream, the North African and Guinea Current, the Southern Connecting Current, the Southern Atlantic Current, the Cape Horn Current, Rennel's Current, and the Arctic Current. The current system is primarily set in motion by the trade-winds which drive the water of the intertropical region from Africa toward the American coasts. The Main Equatorial Current, passing across the Atlantic, is turned by the S. American coast, along which it runs at a rate of 30 to 50 miles a day, till, having received part of the North Equatorial Current, it enters the Gulf of Mexico. Issuing thence between Florida and Cuba under the name of the Gulf-stream, it flows with a gradually expanding channel nearly parallel to the coast of the United States. It then turns northeastward into the mid-Atlantic, the larger proportion of it passing southward to the east of the Azores to swell the North African and Guinea Current created by the northerly winds off the Portuguese coast. The Guinea Current, which takes a southerly course, is divided into two

on arriving at the region of the northeast trades, part of it flowing east to the Bight of Biafra and joining the South African feeder of the Main Equatorial, but the larger portion being carried westward into the North Equatorial drift. Rennel's Current, which is possibly a continuation of the Gulf-stream, enters the Bay of Biscay from the west, curves round its coast, and then turns northwest toward Cape Clear. The Arctic Current runs along the east coast of Greenland (being here called the Greenland Current), doubles Cape Farewell, and flows up toward Davis' Strait; it then turns to the south along the coasts of Labrador and the United States, from which it separates the Gulf-stream by a cold band of water. Immense masses of ice are borne south by this current from the Polar seas. In the interior of the North Atlantic there is a large area comparatively free from currents, called the Sargasso Sea, from the large quantity of seaweed which drifts into it. A similar area exists in the South Atlantic. In the South Atlantic, the portion of the Equatorial Current which strikes the American coast below Cape St. Roque flows southward at the rate of from 12 to 20 miles a day along the Brazil coast under the name of the Brazil Current. It then turns eastward and forms the South Connecting Current, which, on reaching the South African coast, turns northward into the Main and Southern Equatorial Currents. Besides the surface currents, an under current of cold water flows from the poles to the equator, and an upper current of warm water from the equator toward the poles.

The greatest depth as yet discovered is north of Porto Rico, in the West Indies, namely 27,360 feet. Cross-sections of the North Atlantic between Europe and America show that its bed consists of two great valleys lying in a north-and-south direction, and separated by a ridge, on which there is an average depth of 1600 or 1700 fathoms, while the valleys on either side sink to the depth of 3000 or 4000 fathoms. A ridge, called the Wyville-Thomson Ridge, with a depth of little more than 200 fathoms above it, runs from near the Butt of Lewis to Iceland, cutting off the colder water of the Arctic Ocean from the warmer water of the Atlantic. The South Atlantic, of which the greatest depth yet found is over 3000 fathoms, resembles the North Atlantic in having an elevated plateau or ridge in the center with a deep trough on either side. The saltiness and specific gravity of the Atlantic gradually diminish from the tropics to the poles, and also from within a short distance of the tropics to the equator. In the neighborhood of the British Isles the salt has been stated at one thirty-eighth of the weight of the water. The North Atlantic is the greatest highway of ocean traffic in the world. It is also a great area of submarine communication, by means of the telegraphic cables that are laid across its bed.

**ATLAS**, an extensive mountain system in North Africa, starting near Cape Nun on the Atlantic Ocean, traversing

Morocco, Algiers, and Tunis, and terminating on the coast of the Mediterranean; divided generally into two parallel ranges, running w. to e., the Greater Atlas lying toward the Sahara and the Lesser Atlas toward the Mediterranean. The principal chain is about 1500 miles long, and the principal peaks rise above or approach the line of perpetual congelation; Miltsin in Morocco being 11,400 feet high, and Tizi Likumpt being 13,150. The highest elevation is perhaps Tizi Tamyurt, estimated at fully 15,000 feet. Silver, antimony, lead, copper, iron, etc., are among the minerals. The vegetation is chiefly European in character, except on the low grounds and next the desert.

**ATLAS**, in Greek mythology, the name of a Titan whom Zeus condemned to bear the vault of heaven.—The same name is given to a collection of maps and charts, and was first used by Gerard Mercator in the 16th century, the figure of Atlas bearing the globe being given on the title-pages of such works.

**ATONEMENT, DAY OF**, a Jewish fast day observed on the tenth day of the seventh month. Its origin goes back to the Mosaic law, and in ancient times it was observed with much ceremony in the temple at Jerusalem. Today the fast of the atonement is kept by the orthodox among the Jews, who do without food from sunset to sunset, the fast being accompanied by appropriate services in the temple of the congregation.

**ATMOSPHERE**, primarily the gaseous envelope which surrounds the earth; but the term is applied to that of any orb. The atmosphere of the earth consists of a mass of gas extending to a height variously estimated at from 45 to 212 miles, and pressing on every part of the earth's surface with a pressure of about 15 (14.73) lbs. per square inch. The existence of this atmospheric pressure was first proved by Torricelli, who thus accounted for the rush of a liquid to fill a vacuum, and who, working out the idea, produced the first barometer. The average height of the mercurial column counterbalancing the atmospheric weight at the sea-level is a little less than 30 inches; but the pressure varies from hour to hour, and, roughly speaking, diminishes geometrically with the arithmetical increase in altitude. Of periodic variations there are two maxima of daily pressure occurring, when the temperature is about the mean of the day, and two minima, when it is at its highest and lowest respectively; but the problems of diurnal and seasonal oscillations have yet to be fully solved. The pressure upon the human body of average size is no less than 14 tons, but as it is exerted equally in all directions no inconvenience is caused by it. It is customary to take the atmospheric pressure as the standard for measuring other fluid pressures; thus the steam pressure of 30 lbs. per square inch on a boiler is spoken of as a pressure of two atmospheres.

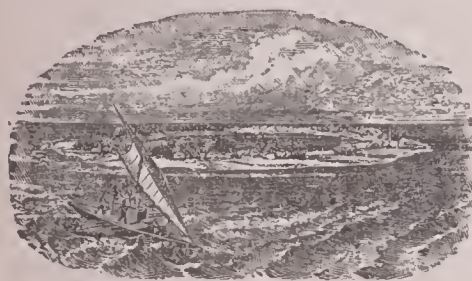
The atmosphere, first subjected to analysis by Priestley and Scheele in the latter part of the 18th century, consists of a mixture of oxygen and nitrogen in the almost constant proportion of 20.81 volumes of oxygen to



79.19 volumes of nitrogen, or, by weight, 23.01 parts of oxygen to 76.99 of nitrogen. The gases are associated together, not as a chemical compound, but as a mechanical mixture. Upon the oxygen present depends the power of the atmosphere to support combustion and respiration, the nitrogen acting as a diluent to prevent its too energetic action. Besides these gases, the air contains the recently-discovered gas argon, aqueous vapor in variable quantity, ozone, carbonic acid gas, traces of ammonia, nitric acid, and, in towns, sulphuretted hydrogen and sulphurous acid gas. In addition to its gaseous constituents the atmosphere is charged with minute particles of organic and inorganic matter.

**ATMOSPHERIC RAILWAY.** See Pneumatic Despatch.

**ATOLL**, the Polynesian name for coral islands of the ringed type inclosing a lagoon in the center. They are found



Bird's-eye view of an atoll.

chiefly in the Pacific in archipelagoes, and occasionally are of large size. Suadiva Atoll is 44 miles by 34; Rimsky is 54 by 20. See Coral.

**ATOM**, until the last decade supposed to be the smallest particle of matter in existence, but since the wonderful discoveries of Becquerel and Thomson, regarded as a whole universe in itself. Recent theories and discoveries regarding the nature of the atom have so altered the views of scientists that today it is believed that in the future man will be able to replace all kinds of power in industry and elsewhere with a force so great that a reservoir a foot or so big will generate enough power to run a railroad train or a steamship; and of such infinite quantity that the bare contemplation of it staggers the intellect. These discoveries lead to the conviction that matter comes into existence out of force and goes back again into force; in other words, that the universe did not exist as matter at one time, and that the time will come when it will cease to exist as matter, but that the universal force will still contain the potentiality of issuing in matter, and so on forever.

The atom of the chemists, then, has been changed into a marvelous world of electromagnetic energy, which is made up of bodies so small as to be simply inconceivable. The atom itself is so small that countless billions of them are required to make up the smallest visible bit of matter; and in one of these atoms exist thousands of these smaller bodies, called "corpuscles" by the English physicists and "electrons" by the French school. The atom breaks down, or disintegrates, when the electrons composing it are at-

tracted to other corpuscles to form new atoms. This implies that the old idea that the elements were the simplest bodies is false. The energy bound up in a cubic inch of iron, or any other element, is so vast that it cannot be imagined. If all the atoms in a cubic inch of iron were dissociated, or broken up, the power obtained would be enormous. If man could once discover a way of producing and controlling such a disintegration, the effect on human society could not be pictured by the most gigantic imagination. Scientists everywhere are working on this problem and the great secret may be discovered at any time.

**ATOMIC THEORY**, a theory as to the existence and properties of atoms (see Atoms); especially, in chemistry, the theory accounting for the fact that in compound bodies the elements combine in certain constant proportions, by assuming that all bodies are composed of ultimate atoms, the weight of which is different in different kinds of matter. It is associated with the name of Dalton, who systematized and extended the imperfect results of his predecessors. On its practical side the atomic theory asserts three Laws of Combining Proportions: (1) The Law of Constant or Definite Proportions, teaching that in every chemical compound the nature and proportion of the constituent elements are definite and invariable; thus water invariably consists of 8 parts by weight of oxygen to 1 part by weight of hydrogen; (2) The Law of Combination in Multiple Proportions, according to which the several proportions in which one element unites with another invariably bear toward each other a simple relation; thus 1 part by weight of hydrogen unites with 8 parts by weight of oxygen to form water, and with 16 parts (i.e.  $8 \times 2$ ) parts of oxygen to form peroxide of hydrogen; (3) The Law of Combination in Reciprocal Proportions, that the proportions in which two elements combine with a third also represent the proportions in which, or in some simple multiple of which, they will themselves combine; thus in olefiant gas hydrogen is present with carbon in the proportion of 1 to 6, and in carbonic oxide oxygen is present with carbon in the proportion of 8 to 6; 1 to 8 being also the proportions in which hydrogen and oxygen combine with each other. The theory that these proportional numbers are, in fact, nothing else but the relative weights of atoms so far accounts for the phenomena that the existence of these laws might have been predicted by the aid of the atomic hypothesis long before they were actually discovered by analysis. In themselves, however, the laws do not prove the theory of the existence of ultimate particles of matter of a certain relative weight; and although many chemists, even without expressly adopting the atomic theory itself, have followed Dalton in the use of the terms atom and atomic weight, in preference to proportion, combining proportion, equivalent, and the like, yet in using the word atom it should be held in mind that it merely denotes the proportions in which elements unite. These will re-

main the same whether the atomic hypothesis which suggested the employment of the term be true or false. Dalton supposed that the atoms of bodies are spherical, and invented certain symbols to represent the mode in which he conceived they might combine together.

**ATOMISTS.** See Atoms.

**ATOMS**, according to the hypothesis of some philosophers, the primary parts of elementary matter not further divisible. The principal theorists of antiquity upon the nature of atoms were Moschus of Sidon, Leucippus (510 B.C.), Democritus, Epicurus, and Lucretius. These philosophers explained all phenomena on the theory of the existence of atoms possessing various properties and motions, and are hence sometimes called Atomists. Among the moderns, Gassendi illustrated the doctrine of Epicurus. Descartes formed from this his system of the vortices. Newton and Boerhaave supposed that the original matter consists of hard, ponderable, impenetrable, inactive, and immutable particles, from the variety in the composition of which the variety of bodies originates. According to Bosovich every atom is an indivisible point possessing position, mass, and potential force or capacity for attraction and repulsion. Upon the discovery of Helmholtz that a vortex in a perfect liquid possesses certain permanent characteristics, Sir W. Thomson (Lord Kelvin) has based a theory that atoms are vortices in a homogeneous, incompressible, and frictionless fluid. As to chemical atoms, see Atomic Theory.

**ATONEMENT**, in Christian theology, the special work of Christ effected by his life, sufferings, and death. The first explicit exposition of the evangelical doctrine of the atonement is ascribed to Anselm, Archbishop of Canterbury, in 1093.

**AT'ROPHY**, a wasting of the flesh due to some interference with the nutritive processes. It may arise from a variety of causes, such as permanent, oppressive, and exhausting passions, organic disease, a want of proper food or of pure air, suppurations in important organs, copious evacuations of blood, saliva, semen, etc., and it is also sometimes produced by poisons; for example, arsenic, mercury, lead, in miners, painters, gilders, etc. In old age the whole frame except the heart undergoes atrophic change, and it is of frequent occurrence in infancy as a consequence of improper, unwholesome food, exposure to cold, damp, or impure air, etc. Single organs or parts of the body may be affected irrespective of the general state of nutrition; thus local atrophy may be superinduced by palsies, the pressure of tumors upon the nerves of the limbs, or by artificial pressure, as in the feet of Chinese ladies.

**AT'ROPIN, AT'ROPINE**, a crystalline alkaloid obtained from the deadly nightshade. It is very poisonous, and produces persistent dilatation of the pupil.

**AT'ROPOS**, the eldest of the Fates, who cuts the thread of life with her shears.



**ATTACHE** (at-a-shā'), a junior member of the diplomatic service attached to an embassy or legation.

**ATTACHMENT**, in English law, a taking of the person, goods, or estate by virtue of a writ or precept. It is distinguished from an arrest by proceeding out of a higher court by precept or writ, whereas the latter proceeds out of an inferior court by precept only. An arrest lies only against the body of a man, whereas an attachment lies often against the goods only, and sometimes against the body and goods. It differs from a distress in that an attachment does not extend to lands, while a distress cannot touch the body.

**ATTAIN'DER**, the legal consequences of a sentence of death or outlawry pronounced against a person for treason or felony, the person being said to be attainted. It resulted in forfeiture of estate and "corruption of blood," rendering the party incapable of inheriting property or transmitting it to heirs; but these results now no longer follow. Formerly persons were often subjected to attainder by a special bill or act passed in parliament.

**ATTAR**, in the East Indies, a general term for a perfume from flowers; in Europe generally used only of the attar or otto of roses, an essential oil made from the hundred-leaved or cabbage-rose, or damask-rose, or musk-rose, etc., 100,000 roses yielding only 180 grains of attar. Cashmere, Shiraz, and Damascus are celebrated for its manufacture, and there are extensive rose farms in the valley of Kezanlik in Roumelia and at Ghazipur in Benares. The oil is at first greenish, but afterwards it presents various tints of green, yellow, and red. It is concrete at all ordinary temperatures, but becomes liquid about 84° Fahr. It consists of two substances, a hydrocarbon and an oxygenated oil, and is frequently adulterated with the oils of rhodium, sandalwood, and geranium, with the addition of camphor or spermaceti.

**ATTIC**, an architectural term variously used. An Attic base is a peculiar kind of base, used by the ancient architects in the Ionic order and by Palladio and some others in the Doric. An Attic story is a low story in the upper part of a house rising above the main portion of the building. In ordinary language an attic is an apartment lighted by a window in the roof.

**ATTICA**, a state of ancient Greece, the capital of which, Athens, was once the first city in the world. According to tradition the earliest inhabitants of Attica lived in a savage manner until the time of Cecrops, who came, B.C. 1550, with a colony from Egypt, taught them all the essentials of civilization, and founded Athens. The period from the Persian war to the time of Alexander (B.C. 500 to 336) was most remarkable for the development of the Athenian constitution. Attica appears to have contained a territory of nearly 850 square miles, with some 500,000 inhabitants, 360,000 of whom were slaves, while the inhabitants of the city numbered 180,000. Cimon and Pericles (B.C. 444) raised Athens to its point of greatest splendor, though under the latter

began the Peloponnesian war, which ended with the conquest of Athens by the Lacedæmonians. The attempts at revolt after the death of Alexander were crushed, and in 260 B.C. Attica was still under the sway of Antigonos Gonatas, the Macedonian king. A period of freedom under the shelter of the Achæan League then ensued, but their support of Mithridates led in B.C. 146 to the subjugation of the Grecian states by Rome. After the division of the Roman Empire Attica belonged to the empire of the East until in A.D. 396 it was conquered by Alaric the Goth and the country devastated. Attica now forms a nome or province of the Kingdom of Greece, with a population of 255,978.

**ATTILA**, the famous leader of the Huns, was the son of Mundzuk, and the successor, in conjunction with his brother Bleda, of his uncle Rhuas. The rule of the two leaders extended over a great part of northern Asia and Europe, and they threatened the Eastern Empire, and twice compelled the weak Theodosius II. to purchase an inglorious peace. Attila caused his brother Bleda to be murdered (444), and in a short time extended his dominion over all the peoples of Germany and exacted tribute from the eastern and western emperors. The Vandals, the Ostrogoths, the Gepidæ, and a part of the Franks united under his banners, and he speedily formed a pretext for leading them against the Empire of the East. He laid waste all the countries from the Black to the Adriatic Sea, and in three encounters defeated the Emperor Theodosius, but could not take Constantinople. Thrace, Macedonia, and Greece all submitted to the invader, who destroyed seventy flourishing cities; and Theodosius was obliged to purchase a peace. Attila went back to Hungary, and died on the night of his marriage with Hilda or Ildico (453), either from the bursting of a blood-vessel or by her hand.

**ATTORNEY**, a person appointed to do something for and in the stead and name of another. An attorney may have general powers to act for another; or his power may be special, and limited to a particular act or acts. A special attorney is appointed by a deed called a power or letter of attorney, specifying the acts which he is authorized to do. An attorney-at-law is a person qualified to appear for another before a court of law to prosecute or defend any action on behalf of his client. In the United States the term attorney, or attorney-at-law is used to designate a practicing lawyer of any kind. Qualifications for the profession are fixed, generally, by statute. The attorney must have studied law either in a college or in the offices of a lawyer, must pass an examination, and must be a man of good moral character. He takes, upon admission to the bar, an oath that he will demean himself uprightly and will support the constitution of the United States.

**ATTORNEY-GENERAL**, in the United States an officer of the president's cabinet, the chief of the law department of the government. He receives a salary of \$8000 a year. The attorney-

general of the several states has a function similar to that of his federal prototype.

**ATTORNEY, POWER OF**, the power given by one person to another enabling him to act, generally or specifically, as the agent of the principal.

**ATTORNEY, WARRANT OF**, authority given to a lawyer to appear in court as representative for a client.

**ATTRAC'TION**, the tendency of all material bodies, whether masses or particles, to approach each other, to unite, and to remain united. It was Newton that first adopted the theory of a universal attractive force, and determined its laws. When bodies tend to come together from sensible distances the tendency is termed either the attraction of gravitation, magnetism, or electricity, according to circumstances; when the attraction operates at insensible distances it is known as adhesion with respect to surfaces, as cohesion with respect to the particles of a body, and as affinity when the particles of different bodies tend together. It is by the attraction of gravitation that all bodies fall to the earth when unsupported.

**AT'TRIBUTE**, in philosophy, a quality or property of a substance, as whiteness or hardness. A substance is known to us only as a congeries of attributes. —In the fine arts an attribute is a symbol regularly accompanying and marking out some personage. Thus the caduceus, purse, winged hat, and sandals are attributes of Mercury, the trampled dragon of St. George.

**ATWOOD**, Charles B., an American architect, born in 1849, died in 1895. He is known as the designer of the Art Building at the Chicago World's Fair, and of W. H. Vanderbilt's residence in New York City.

**AUBE** (6b), a northeastern French department; area, 2351 sq. miles; pop. 257,374. The surface is undulating, and watered by the Aube, etc. Troyes is the capital.—The river Aube, which gives name to the department, rises in Haute-Marne, flows n.w., and after a course of 113 miles joins the Seine.

**AU'BURN**, the name of many places in America, the chief being a city of New York state, at the north end of Owasco Lake. It is chiefly famous for its state prison, large enough to receive 1000 prisoners. In the town or vicinity various manufactures are carried on. Pop. 32,000.

**AUBURN**, a city, and the county seat of Androscoggin Co., Maine, 34 miles north of Portland, on the Maine Central and Grand Trunk railroads. Pop. 12,951.

**AUCKLAND**, a town of New Zealand, in the North Island, founded in 1840. It has a large and increasing trade, there being connection with the chief places on the island by rail, and regular communication with the other ports of the colony, Australia, and Fiji by steam. It was formerly the capital of the colony. Pop., (including suburbs), 67,226. —The provincial district of Auckland forms the northern part of North Island, with an area of 25,746 sq. miles; pop. 175,854.



**AUCKLAND ISLANDS**, a group of islands about 180 miles s. of New Zealand, discovered in 1806, and belonging to Britain. They are of volcanic origin

Dr. Bachman on a finely illustrated work entitled *The Quadrupeds of America* (1843-50, 3 vols.). He died at New York in 1851.



and fertile; and the largest, which is 30 miles by 15, has two good harbors. No settled inhabitants.

**AUCTION** is a public sale to the party offering the highest price where the buyers bid upon each other, or to the bidder who first accepts the terms offered by the vendor where he sells by reducing his terms until some one accepts them.

**AUDE** (ôd), a maritime department in the s. of France; area, 2,437 sq. miles; Carcassonne is the capital; other towns are Narbonne and Castelnaudary. Pop. 332,080.—The river Aude rises in the eastern Pyrenees, and flowing nearly parallel to the canal du Midi falls into the Mediterranean, after a course of 130 miles.

**AU'DIPHONE**, an acoustic instrument by means of which deaf persons are enabled to hear. It consists essentially of a fan-shaped plate of hardened caoutchouc, which is bent to a greater or less degree by strings, and is very sensitive to sound-waves. When used the up edge is pressed against the upper front teeth, with the convexity outward, and the sounds being collected are conveyed from the teeth to the auditory nerve without passing through the external ear.

**AU'DIT**, an examination into accounts or dealings with money or property, along with vouchers or other documents connected therewith, especially by proper officers, or persons appointed for the purpose. Also the occasion of receiving the rents from the tenants on an estate.

**AUDITORY NERVES.** See Ear.

**AU'DUBON**, John James, an American naturalist of French extraction, born near New Orleans in 1775. In 1798 he settled in Pennsylvania, but having a great love for ornithology he set out in 1810 with his wife and child, descended the Ohio, and for many years roamed the forests in every direction, drawing the birds which he shot. In 1826 he exhibited his drawings in Liverpool, Manchester, and Edinburgh, and finally published them in an unrivaled work of double-folio size, with 435 colored plates of birds the size of life (*The Birds of America*, 4 vols., 1827-39), with an accompanying text (*Ornithological Biography*, 5 vols. 8vo, partly written by Prof. Macgillivray). On his final return to America he labored with

**AUGEAS** (a-jē'as), a fabulous king of Elis, in Greece, whose stable contained 3000 oxen, and had not been cleaned for thirty years. Hercules undertook to clear away the filth in one day in return for a tenth part of the cattle, and executed the task by turning the river Alphæus through it. Augeas, having broken the bargain, was deposed and slain by Hercules.

**AUGER** (a'gér), an instrument for boring holes considerably larger than those bored by a gimlet, used by carpenters and joiners, shipwrights, etc.

**AUGITE** (a'jit), or **PYROXENE**, a mineral of the hornblende family, an essential component of many igneous rocks, such as basalt, greenstone, and porphyry. When crystallized it assumes the form of short, slightly rhombic prisms, with their lateral edges replaced, and terminated at one or both extremities by numerous planes.



**AUGSBURG** (ougz'burk), a city of Bavaria, at the junction of the Wertach and Lech. Augsburg was a renowned commercial center in the middle ages, and is still an important emporium of South German and Italian trade. It early took a conspicuous part in the Reformation. In 1806 it was incorporated in Bavaria. Pop. 88,700.

**AUGSBURG CONFESSION**, a document which was presented by the Prot-

estants at the Diet of Augsburg, 1530, to the Emperor Charles V. and the diet, and being signed by the Protestant states was adopted as their creed. Luther made the original draught; but as its style appeared too violent it was given to Melancthon for amendment. The original is to be found in the imperial Austrian archives. Afterwards Melancthon arbitrarily altered some of the articles, and there arose a division between those who held the original and those who held the altered Augsburg Confession. The former is received by the Lutherans, the latter by the German Reformed.

**AU'GUST**, the eighth month from January. It was the sixth of the Roman year, and hence was called Sextilis till the Emperor Augustus affixed to it his own name.

**AUGUSTA**, capital of Maine, United States, on the river Kennebec, which is crossed by a bridge and is navigable for



State capitol, Augusta, Me.

small vessels 43 miles from its mouth, while a dam enables steamboats to ply for 20 miles farther up and furnishes immense water-power. Pop. 11,683.

**AUGUSTA**, the capital of Richmond Co., Georgia, United States, on the left bank of the Savannah river, 231 miles from its mouth; well built, and connected with the river by high-level canals; an important manufacturing center, having cotton-mills, machine-shops, and railroad works, etc. Pop. 39,441.

**AU'GUSTINE** (Aurelius Augustinus), St., a renowned father of the Christian Church, was born at Tagaste, in Africa, in 354, his mother Monica being a Christian, his father Patricius a Pagan. Of his various works his *Confessions* is most secure of immortality. He died August 28, 430. He was a man of great enthusiasm, self-devotion, zeal for truth, and powerful intellect, and though there have been fathers of the church more learned, none have wielded a more powerful influence. His writings are partly autobiographical (as the *Confessions*), partly polemical, homiletic, or exegetical.

**AU'GUSTINE**, or **AUSTIN**, St., the Apostle of the English, flourished at the close of the 6th century, was sent with forty monks by Pope Gregory I. to introduce Christianity into Saxon England,



and was kindly received by Ethelbert, king of Kent, whom he converted, baptizing 10,000 of his subjects in one day. In acknowledgment of his tact and success Augustine received the archiepiscopal pall from the pope, with instructions to establish twelve sees in his province, but he could not persuade the British bishops in Wales to unite with the new English Church. He died in 604 or 605.

**AUGUSTUS**, Caius Julius Cæsar Octavianus, originally called Caius Octavius, Roman Emperor, was the son of Caius Octavius and Atia, a daughter of Julia, the sister of Julius Cæsar. He was born



Emperor Augustus.

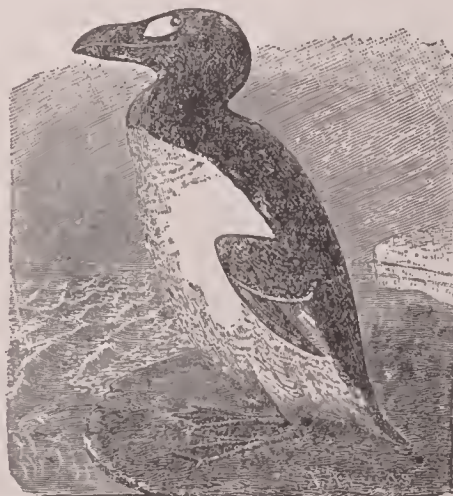
63 B.C., and died A.D. 14. Octavius was at Apollonia, in Epirus, when he received news of the death of his uncle (B.C. 44), who had previously adopted him as his son. He returned to Rome to claim Cæsar's property and avenge his death, and now took, according to usage, his uncle's name with the surname Octavianus. He was aiming secretly at the chief power, but at first he joined the republican party, and assisted at the defeat of Antony at Mutina. He got himself chosen consul in 43. Soon after the first triumvirate was formed between him and Antony and Lepidus, and this was followed by the conscription and assassination of three hundred senators and two thousand knights of the party opposed to the triumvirate. Next year Octavianus and Antony defeated the republican army under Brutus and Cassius at Philippi. The victors now divided the Roman world between them, Octavianus getting the West, Antony the East, and Lepidus Africa. Sextus Pompeius, who had made himself formidable at sea, had now to be put down; and Lepidus, who had hitherto retained an appearance of power, was deprived of all authority (B.C. 36) and retired into private life. Antony and Octavianus now shared the empire between them; but while the former, in the East, gave himself up to a life of luxury, and alienated the Romans by his alliance with Cleopatra and his adoption of Oriental manners, Octavianus skilfully cultivated popularity, and soon declared war ostensibly against the Queen of Egypt. The naval victory of Actium, in which the fleet of Antony and Cleopatra was defeated, made Octavianus master of the world, B.C. 31. He returned to Rome B.C. 29, celebrated a splendid triumph, and caused

the temple of Janus to be closed in token of peace being restored. Gradually all the highest offices of state, civil and religious, were united in his hands, and the new title of Augustus was also assumed by him, being formally conferred by the senate in B.C. 27. Great as was the power given to him, he exercised it with wise moderation, and kept up the show of a republican form of government. He adorned Rome in such a manner that it was said, "He found it of brick, and left it of marble." The people erected altars to him, and, by a decree of the senate, the month Sextilis was called Augustus (our August). He was a patron of literature; Virgil and Horace were befriended by him, and their works and those of their contemporaries are the glory of the Augustan Age. His death, which took place at Nola, plunged the empire into the greatest grief.

**AUGUSTUS II., or FREDERICK-AUGUSTUS I.**, Elector of Saxony and King of Poland, second son of John George III., elector of Saxony, was born at Dresden in 1670, died at Warsaw 1733. He succeeded his brother in the electorate in 1694, and the Polish throne having become vacant, in 1696, by the death of John Sobieski, Augustus presented himself as a candidate for it and was successful. His wife left him one son. The Countess of Königsmark bore him the celebrated commander Marshal Saxe (Maurice of Saxony).

**AUGUSTUS III., or FREDERICK-AUGUSTUS II.**, Elector of Saxony and King of Poland, son of Augustus II., born at Dresden 1696, succeeded his father as elector in 1733, and was chosen King of Poland through the influence of Austria and Russia. He died in 1763. His son, Frederick Christian, succeeded him as Elector of Saxony, and Stanislaus Poniatowski as King of Poland.

**AUK**, a name of certain swimming birds, including the great auk, the little auk, the puffin, etc. The great auk or gair-fowl, a bird about 3 feet in length, used to be plentiful in northerly regions,



Great auk.

and also visited the British shores, but has become extinct. Some seventy skins, about as many eggs, with bones representing perhaps a hundred individuals, are preserved in various museums. Though the largest species of the family,

the wings were only 6 inches from the carpal joint to the tip, totally useless for flight, but employed as fins in swimming, especially under water. The tail was about 3 inches long; the beak was high, short, and compressed; the head, neck, and upper parts were blackish; a large spot under each eye, and most



Razor-bill auk.

of the under parts white. Its legs were placed so far back as to cause it to sit nearly upright. The razor-bill is about 15 inches in length, and its wings are sufficiently developed to be used for flight. It is found in numbers on some parts of the British shores, as the Isle of Man.

**AURELIAN**, Lucius Domitius Aurelianus, Emperor of Rome, of humble origin, was born about 212 A.D., rose to the highest rank in the army, and on the death of Claudius II. (270) was chosen emperor. He delivered Italy from the barbarians, and conquered the famous Zenobia, queen of Palmyra. He followed up his victories by the reformation of abuses, and the restoration throughout the empire of order and regularity. He lost his life, A.D. 275, by assassination, when heading an expedition against the Persians.

**AURELIUS ANTONINUS**, Marcus, often called simply Marcus Aurelius, Roman emperor and philosopher, son-in-law, adopted son, and successor of Antoninus Pius, born A.D. 121, succeeded to the throne 161, died 180. He voluntarily shared the government with Lucius Verus, whom Antoninus Pius had also adopted. Brought up and instructed by Plutarch's nephew, Sextus, the orator Herodes Atticus, and L. Volusius Mæcianus, the jurist, he had become acquainted with learned men, and formed a particular love for the Stoic philosophy. A war with Parthia broke out in the year of his accession, and did not terminate till 166. A confederacy of the northern tribes now threatened Italy, while a frightful pestilence, brought from the East with the army, raged in Rome itself. Both emperors set out in person against the rebellious tribes. In 169 Verus died, and the sole command of the war devolved on Marcus Aurelius, who prosecuted it with the utmost rigor, and nearly exterminated the Marcomanni. After this victory the Marcomanni, the Quadi, as well as the rest of the barbarians, sued for peace. The sedition of the Syrian governor Avidius Cassius, with whom Faustina, the empress, was in treasonable communication, called off the emperor from his conquests, but before he reached Asia the rebel was assassinated. Aurelius returned to Rome,



after visiting Egypt and Greece, but soon new incursions of the Marcomanni compelled him once more to take the field. He defeated the enemy several times, but was taken sick at Sirmium, and died at Vindobona (Vienna) in 180. His only extant work is the *Meditations*, written in Greek, and which has been translated into most modern languages. This may be regarded as a manual of practical morality, in which wisdom, gentleness, and benevolence are combined in the most fascinating manner. Many believe it to have been intended for the instruction of his son Commodus. Aurelius was one of the best emperors ever Rome saw, although his philosophy and the magnanimity of his character did not restrain him from the persecution of the Christians, whose religious doctrines he was led to believe were subversive of good government.

**AUR'ENGZEBE** (-zēb), one of the greatest of the Mogul emperors of Hindustan, born in Oct., 1618 or 1619. In his twentieth year he raised a body of troops by his address and good fortune, and obtained the government of the Deccan. He murdered his relatives one after the other, and in 1659 ascended the throne. Two of his sons, who endeavored to form a party in their own favor, he caused to be arrested and put to death by slow poison. He carried on many wars, conquered Golconda and Bijapur, and drove out, by degrees, the Mahrattas from their country. After his death in 1707 the Mogul Empire declined.

**AURICULAR CONFESSION.** See Confession.

**AURO'RA**, in classical mythology, the goddess of the dawn, daughter of Hyperion and Theia, and sister of Helios and Selēnē (Sun and Moon). She was represented as a charming figure, "rosy-fingered," clad in a yellow robe, rising at dawn from the ocean and driving her chariot through the heavens.

**AURO'RA**, a city of Kane Co., Illinois,

**AURO'RA BOREA'LIS**, a luminous meteoric phenomenon appearing in the north, most frequently in high latitudes, the corresponding phenomenon in the southern hemisphere being called *Aurora Australis*, and both being also called *Polar Light*, *Streamers*, etc. The northern aurora has been far the more observed and studied. It usually manifests itself by streams of light ascending toward the zenith from a dusky line of cloud or haze a few degrees above the horizon, and stretching from the north toward the west and east, so as to form an arc with its ends on the horizon, and its different parts and rays are constantly in motion. Sometimes it appears in detached places; at other times it almost covers the whole sky. It assumes many shapes and a variety of colors, from a pale red or yellow to a deep red or blood color; and in the northern latitudes serves to illuminate the earth and cheer the gloom of the long winter nights. The appearance of the aurora borealis so exactly resembles the effects of artificial electricity that there is every reason to believe that their causes are identical. When electricity passes through rarefied air it exhibits a diffused luminous stream which has all the characteristic appearance of the aurora, and hence is highly probable that this natural phenomenon is occasioned by the passage of electricity through the upper regions of the atmosphere. The influence of the aurora upon the magnetic needle is now considered as an ascertained fact, and the connection between it and magnetism is further evident from the fact that the beams or eoruscations issuing from a point in the horizon west of north are frequently observed to run in the magnetic meridian. What are known as magnetic storms are invariably connected with exhibitions of the aurora, and with spontaneous galvanic currents in the ordinary telegraph wires; and

two are also observable. The aurora borealis is said to be frequently accompanied by sound, which is variously described as resembling the rustling of pieces of silk against each other, or the sound of wind against the flame of a candle. The aurora of the southern hemisphere is quite a similar phenomenon to that of the north.

**AUST'EN**, Jane, English novelist, born 1775, at Steventon, in Hants. Her principal novels are *Sense and Sensibility*; *Pride and Prejudice*; *Mansfield Park*; and *Emma*. She died in 1817.

**AUST'ERLITZ**, a town with 3452 inhabitants, in Moravia, 10 miles e. of Brünn, famous for the battle of the 2d of December, 1805, fought between the French (70,000 in number) and the allied Austrian and Russian armies (95,000). The decisive victory of the French led to the Peace of Pressburg between France and Austria.

**AUST'IN**, capital of the state of Texas, on the Colorado, about 200 miles from its mouth, and accessible to steamboats



State capitol, Austin, Tex.

during certain seasons. There is a state university and other institutions, and a splendid capitol built of red granite. Pop. 25,000.

**AUSTRALASIA**, a division of the globe usually regarded as comprehending the islands of Australia, Tasmania, New Zealand, New Caledonia, the New Hebrides, the Solomon Islands, New Ireland, New Britain, the Admiralty Islands, New Guinea, and the Arru Islands, besides numerous other islands and island groups; estimated area, 3,400,000 sq. miles; pop. 6,000,000. It forms one of three portions into which some geographers have divided Oceania, the other two being Maylasia and Polynesia.

**AUSTRALIA**, the largest island in the world, a sea-girt continent, lying between the Indian and Pacific Oceans, s.e. of Asia; between lat. 10° 39' and 39° 11' s.; lon. 113° 5' and 153° 16' e.; greatest length, from w. to e., 2400 miles; greatest breadth, from n. to s., 1700 to 1900 miles. It is separated from New Guinea on the north by Torres Strait, from Tasmania on the south by Bass Strait. It is divided into two unequal parts by the Tropic of Capricorn, and consequently belongs partly to the South Temperate, partly to the Torrid Zone. It is occupied by five British colonies; namely, New South Wales, Victoria, and Queensland in the east; South Australia in the middle, stretching from sea to sea; and Western Australia in the west. Their area and popu-



Aurora borealis, as seen when crossing the polar circle.

on the Fox river, 40 miles w. by s. of Chicago; it has flourishing manufactories, railway works, and a considerable trade. Pop. 21,000.

this connection is found to be so certain that, upon remarking the display of one of the three classes of phenomena, we can at once assert that the other













VICINITY  
OF  
SYDNEY

Scale of Miles

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0 50 100 200 300 400

Railways

Unfinished Railways

Exploration tracks marked thus

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158 Longitude West 163 from Washington 168 Wessel Is. 173 Torres Strait 178 Cape York 183

188

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lation are as follows (but authorities differ as to the areas):

	Area in sq. m.	Pop.
N. S. Wales.....	310,700	1,459,943
Victoria.....	87,884	1,341,506
Queensland.....	668,497	503,266
South Australia...	903,425	402,604
Western Australia.	975,920	192,553
	2,946,426	3,899,872

Sydney, Melbourne, Adelaide, Brisbane, and Perth are the chief towns. The population of the Commonwealth of Australia, which includes the above colonies or states and also Tasmania, was 4,282,347

The interior, so far as explored, is largely composed of rocky tracts and barren plains with little or no water. The whole continent forms an immense plateau, highest in the east, low in the center, and with a narrow tract of land usually intervening between the elevated area and the sea.

The rivers of Australia are nearly all subject to great irregularities in volume, many of them at one time showing a channel in which there is merely a series of pools, while at another they inundate the whole adjacent country. The chief is the Murray, which, with its affluents the Murrumbidgee, Lachlan, and Darling, drains a great part of the interior west of the Dividing Range, and falls into the sea on the south coast (after entering Lake Alexandrina). Its greatest tributary is the Darling, which may even be regarded as the main stream. On the east coast are the Hunter, Clarence, Brisbane, Fitzroy, and Burdekin; on the west, the Swan, Murchison, Gascoyne, Ashburton, and De Grey; on the north, the Fitzroy, Victoria, Flinders, and Mitchell. The Australian rivers are of little service in facilitating internal communication. Many of them lose themselves in swamps or sandy wastes of the interior. A considerable river of the interior is Cooper's Creek, or the Barcoo, which falls into Lake Eyre, one of a group of lakes on the south side of the continent having no outlet, and accordingly salt. The principal of these are Lakes Eyre, Torrens, and Gairdner, all of which vary in size and saltiness according to the season. Another large salt lake of little depth, Lake Amadeus, lies a little west of the center of Australia. Various others of less magnitude are scattered over the interior.

The climate of Australia is generally hot and dry, but very healthful.

Australia is a region containing a vast quantity of mineral wealth. Foremost come its rich and extensive deposits of gold, which, since its discovery in 1851, have produced a total of more than two billion dollars. The greatest quantity has been obtained in Victoria, but New South Wales and Queensland have also yielded a considerable amount. Rich stores of gold have recently been discovered in W. Australia. Australia also possesses silver, copper, tin, lead, zinc, antimony, mercury, plumbago, etc., besides coal (now worked to a considerable extent in New South Wales) and iron. Various precious stones are

found, as the garnet, ruby, topaz, sapphire, and even the diamond. Of building stone there are granite, limestone, marble, and sandstone.

The Australian flora presents peculiarities which mark it off by itself in a very decided manner. Many of its most striking features have an unmistakable relation to the general dryness of the climate. The trees and bushes have for the most part a scanty foliage, presenting little surface for evaporation, or thick leathery leaves well fitted to retain moisture. The most widely spread types of Australian vegetation are the various kinds of gum-tree, the shea-oak, the acacia or wattle, the grass-tree, and a great number of ferns and tree-ferns. Of the gum-tree there are found upward of 150 species, many of which are of great value. Individual specimens of the "peppermint" have been found to measure from 480 to 500 feet in height. As timber-trees the most valuable members of this genus are the red-gum, the timber of



Australian aboriginals.

which is hard, dense, and almost indestructible. A number of the gum-trees have deciduous bark. The wattle or acacia includes about 300 species, some of them of considerable economic value, yielding good timber or bark for tanning. The most beautiful and most useful is that known as the golden wattle, which in spring is adorned with rich masses of fragrant yellow blossom. Palms—of which there are 24 species, all except the coco-palm peculiar to Australia—are confined to the north and east coasts. Beautiful flowering plants are numerous. Australia also possesses great numbers of turf-forming grasses, such as the kangaroo-grass, which survives even a tolerably protracted drought. The native fruit-trees are few and unimportant, and the same may be said of the plants yielding roots used as food; but exotic fruits and vegetables may now be had in the different colonies in great abundance and of excellent quality. The vine, the olive, and mulberry thrive well, and quantities

of wine are now produced. The cereals of Europe and maize are extensively cultivated, and large tracts of country, particularly in Queensland, are under the sugar-cane.

The Australian fauna is almost unique in its character. Its great feature is the nearly total absence of all the forms of Mammalia which abound in the rest of the world, their place being supplied by a great variety of marsupials—these animals being nowhere else found, except in the opossums of America. There are about 110 kinds of marsupials (of which the kangaroo, wombat, bandicoot, and phalangers or opossums, are the best-known varieties), over twenty kinds of bats, a wild dog (the dingo), and a number of rats and mice. Two extraordinary animals, the platypus, or water-mole of the colonist, and the porcupine ant-eater, constitute the lowest order of mammals, and are confined to Australia. Their young are produced from eggs. Australia now possesses a large stock of the domestic animals of Britain, which thrive there remarkably well. The breed of horses is excellent. Horned cattle and sheep are largely bred, the first attaining a great size, while the sheep improve in fleece and their flesh in flavor. There are upward of 650 different species of birds, the largest being the emu, or Australian ostrich, and a species of cassowary. Peculiar to the country are the black-swan, the honey-sucker, the lyre-bird, the brush-turkey, and other mound-building birds, the bower-birds, etc. The parrot tribe preponderate over most other groups of birds in the continent. There are many reptiles, the largest being the alligator, found in some of the northern rivers. There are upwards of 60 different species of snakes, some of which are very venomous. Lizards, frogs, and insects are also numerous in various parts. The seas, rivers, and lagoons abound in fish of numerous varieties, and other aquatic animals, many of them peculiar. Whales and seals frequent the coasts. On the n. coasts are extensive fisheries of trepang, much visited by native traders from the Indian Archipelago. Some animals of European origin, such as the rabbit and the sparrow, have developed into real pests in several of the colonies.

The natives belong to the Australian negro stock, and are sometimes considered the lowest as regards intelligence in the whole human family, though this is doubtful. They number about 60,000, exclusive of those in the unexplored parts, and are of a dark-brown or black color, with jet-black curly but not woolly hair, of medium size, but inferior muscular development. In the settled parts of the continent they are inoffensive, and rapidly dying out.

Till recently each of the colonies was quite independent of the others. Latterly for a number of years there had been a movement in favor of Australian federation and a Federal Convention sat at Adelaide in 1897-98 and drafted a Constitution Bill for the formation of an Australian Commonwealth, which in 1900 was actually established by act of the British Parliament. The colonies



or states included in the Commonwealth comprise Tasmania as well as the five Australian colonies proper. The colonies have a considerable defensive force of militia and volunteers, also a number of gun-boats, torpedo-boats, etc., besides which there is always a squadron of British men-of-war on the Australian station. Education is well provided for, instruction in the primary schools being in some cases free and compulsory, and the higher education being more and more attended to. There are flourishing universities in Melbourne, Sydney, and Adelaide. Newspapers are exceedingly numerous, and periodicals of all kinds are abundant. There is as yet no native literature of any distinctive type, but names of Australian writers of ability both in prose and poetry are beginning to be known beyond their own country.

Pastoral and agricultural pursuits and mining are the chief occupations of the people, though manufactories and handicrafts also employ large numbers.

It is doubtful when Australia was first discovered by Europeans. Between 1531 and 1542 the Portuguese published the existence of a land which they called Great Java, and which corresponded to Australia, and probably the first discovery of the country was made by them early in the 16th century. The first authenticated discovery is said to have been made in 1601, by a Portuguese named Manoel Godinh de Eredia. In 1606 Torres, a Spaniard, passed through the strait that now bears his name, between New Guinea and Australia. Between this period and 1628 a large portion of the coast-line of Australia had been surveyed by various Dutch navigators. In 1664 the continent was named New Holland by the Dutch government. In 1688 Dampier coasted along part of Australia, and about 1700 explored a part of the w. and n.w. coasts. In 1770 Cook carefully surveyed the e. coast, named a number of localities, and took possession of the country for Britain. He was followed by Bligh in 1789, who carried on a series of observations on the n.e. coast, adding largely to the knowledge already obtained of this new world. Colonists had now arrived on the soil, and a penal settlement was formed (1788) at Port Jackson. In this way was laid the foundation of the future colony of New South Wales. The Moreton Bay district (Queensland) was settled in 1825; in 1835 the Port Phillip district. In 1851 the latter district was erected into a separate colony under the name of Victoria. Previous to this time the colonies both of Western Australia and of South Australia had been founded—the former in 1829, the latter in 1836. The latest of the colonies is Queensland, which only took an independent existence in 1859.

July 9, 1900, the British Parliament passed an act empowering the six provinces of Australia to form a federal union and Jan. 1 1901, the new commonwealth was proclaimed at Sydney, N. S. W. Its first parliament was opened May 9, 1901. In 1903 Bombala, N. S. W., was chosen as the permanent capital.

**AUSTRIA, or AUSTRIA-HUNGARY,** an extensive duplex monarchy in central Europe, inhabited by several distinct nationalities, and consisting of two semi-independent countries, each with its own parliament and government, but with one common sovereign, army, and system of diplomacy, and also with a common parliament. The Austrian Empire now has a total area of about 240,000 sq. miles, and is bounded s. by Turkey, the Adriatic, and Italy; w. by Switzerland, Bavaria, and Saxony; n. by Prussia and Russian Poland; and e. by Russia and Rumania. On the shores of the Adriatic, along the coasts of Dalmatia, Croatia, Istria, etc., lies its only sea frontage, which is of comparatively insignificant extent. Pop. about 43,000,000. The largest cities are Vienna, Budapest, Prague, Trieste, Lemberg, Gratz, Brunn, Szegedin, Maria Theresiopoli, Cracow. Bosnia and Herzegovina, formerly Turkish, now administered by Austria, have an area of 19,728 sq. miles. Pop. 1,591,036.

The prevailing character of the Austrian dominions is mountainous or hilly, the plains not occupying more than a fifth part of the whole surface. The loftiest ranges belong to the Alps, and are found in Tyrol, Styria, Salzburg, and Carinthia, the highest summits being the Ortlerspitzen (12,814 feet) on the western boundary of Tyrol, and the Grossglockner (12,300) on the borders of Salzburg, Tyrol, and Carinthia. Another great range is that of the Carpathians, bounding Hungary on the north. The most extensive tracts of low or flat land, much of which is very fertile, occur in Hungary, Galicia, and Slavonia, the great Hungarian plain having an area of 36,000 sq. miles. They stretch along the courses of the rivers, of which the chief are the Danube, with its tributaries the Save, the Drave, the Theiss, the Maros, the Waag, the March, the Raab, the Inn; also the Elbe and Moldau and the Dniester. The Danube for upward of 800 miles is navigable for pretty large vessels; the tributaries also are largely navigable. The lakes are numerous and often picturesque, the chief being Lake Balaton on the Plattensee. The climate is exceedingly varied, but generally good. The principal products of the north are wheat, barley, oats, and rye; in the center vines and maize are added; and in the south olives and various fruits. The cereals grow to perfection, Hungarian wheat and flour being celebrated. Other crops are hops, tobacco, flax, and hemp. Wine is largely made, but the wines are inferior on the whole, with exception of a few kinds, including Tokay. The forests cover 70,000 sq. miles, or one-third of the productive soil of the empire. Sheep and cattle are largely reared.—Wild deer, wild swine, chamois, foxes, lynxes, and a species of small black bear are found in many districts, the fox and lynx being particularly abundant. Herds of a small native breed of horses roam wild over the plains of Hungary.—In mineral productions Austria is very rich, possessing, with the exception of platinum, all the useful metals, the principal being coal, salt, and iron.

Manufactures are in the most flourishing condition in Bohemia, Moravia, Silesia, and Lower Austria; less so in the eastern provinces, and insignificant in Dalmatia, Bukowina, Herzegovina, etc. Among the most important manufactures are those of machinery and metal goods, Austria holding a high place for the manufacture of musical and scientific instruments, gold and silver plate and jewelry; of stone and china-ware, and of glass, which is one of the oldest and most highly developed industries in Austria; of chemicals; of sugar from beet; of beer, spirits, etc., and especially the manufactures of woolen, cotton, hemp, and flax. The manufacture of tobacco is a state monopoly. Tanning is carried on to a great extent, and in the production of gloves (in Vienna and Prague) Austria stands next to France.

None of the European states, except Russia, exhibits such a diversity of race and language as the Austrian Empire. The Slavs—who differ greatly, however, among themselves in language and civilization—amount to above 17,000,000, or 45 per cent of the total population, and form the great mass of the population of Bohemia, Moravia, Carniola, Galicia, Dalmatia, Croatia, and Slavonia, and northern Hungary, and half of the population of Silesia and Bukowina. The Germans, about 10,600,000, form almost the sole population of the archduchy of Austria, Salzburg, the greatest portion of Styria and Carinthia, almost the whole of Tyrol and Vorarlberg, large portions of Bohemia and Moravia, the whole of West Silesia, etc.; and they are also numerous in Hungary and Transylvania. The Magyars or Hungarians (7,400,000) form the bulk of the inhabitants of the Kingdom of Hungary and eastern Transylvania. Of the Italic or western Romanic stock there are about 700,000, and in the southeast about 2,800,000 of the Rumanian or eastern Romanic stock. The number of Jews is above 1,000,000; and there are other races, such as the Gypsies (150,000), who are most numerous in Hungary and Transylvania, and the Albanians in Dalmatia and the adjacent parts. The population, generally speaking, decreases in density from west to east.

The state religion of Austria is the Roman Catholic, but the civil power exercises supreme control in all ecclesiastical matters. In 1900 there were in the Austrian portion of the monarchy 20,660,279 Roman Catholics, 3,136,535 Greek Catholics united to the Roman Church, 606,764 non-united, 494,011 Protestants, and 1,224,899 Jews. In Hungary and Transylvania there were 9,919,913 Roman Catholics, 1,854,143 Greek united and 2,815,713 non-united, 3,730,084 Protestants, and 851,378 Jews.

The intellectual culture of the people is highest in the German provinces, but in some of the other provinces the illiterates number as many as 80 to 90 per cent. Yet for a number of years attendance on the elementary schools has been compulsory on all children from their sixth to the end of their twelfth year; and there are higher





# AUSTRIA-HUNGARY

Scale of Miles  
0 20 40 60 80 100 120  
Railways thus ———

12 14 16 18 20 22 24 Longitude East from Greenwich







schools on which attendance is compulsory for young people of thirteen to fifteen years (not elsewhere educated). There are numerous gymnasia and "real-schools," the gymnasia being intended chiefly to prepare pupils for the universities, while in the real-schools a more practical end is kept in view, and modern languages and physical science form the groundwork of the educational course; also agricultural, commercial, industrial, art, music, and other special schools. There are eleven universities, viz. in Vienna, Prague (2), Budapest, Gratz, Cracow, Lemberg, Innsbruck, Klausenburg, Agram, and Czernowitz. Most of these have four faculties—Catholic theology, law and politics, medicine, and philosophy.

The ruler of the Austro-Hungarian monarchy has the title of emperor so far as concerns his Austrian dominions, but he is only king of Hungary. All matters affecting the joint interests of the two divisions of the empire, such as foreign affairs, war, and finance, are dealt with by a supreme body known as the Delegations—a parliament of 120 members, one-half of whom are chosen by and represent the legislature of German Austria and the other half that of Hungary. The legislative center of the Austrian division of the empire is the Reichsrath, or council of the realm, consisting of an upper house (Herrenhaus), composed of princes of the imperial family, nobles with the hereditary right to sit, archbishops and life-members nominated by the emperor; and a lower house (Abgeordnetenhaus) of 353 elected deputies. There are seventeen provincial diets or assemblies, each provincial division having one. In the Hungarian division of the empire the legislative power is vested in the king and the diet or Reichstag conjointly, the latter consisting of an upper house or house of magnates and of a lower house or house of representatives, the latter elected by all citizens of full age paying direct taxes to the amount of 16s a year. The powers of the Hungarian Reichstag correspond to those of the Reichsrath of the Cisleithan provinces. There being three distinct parliaments in the empire, there are also three budgets, that, viz., for the whole empire, that for Cisleithan, and that for Transleithan Austria. A small portion of the imperial revenue of Austria is derived from customs and other sources, 70 per cent of the remainder being made up by the Cisleithan and 30 per cent by the Transleithan divisions of the empire.

Military service is obligatory on all citizens capable of bearing arms who have attained the age of twenty. The period of service is twelve years, of which three are passed in the line, seven in the reserve, and two in the landwehr. The army numbers over 290,000 men (including officers) on the peace-footing and over 1,500,000 on the war-footing. The most important portion of the Austrian navy comprises 12 iron-clads, of from 5 to 14-inch armor, the largest having a tonnage of over 7000, and carrying 27-ton guns; besides gunboats, torpedo vessels, and other vessels, mostly small and intended for coast

defense. The crews number about 10,000 officers and men.

In 791 Charlemagne drove the Avars from the territory between the Enns and the Raab, and united it to his empire under the name of the Eastern Mark (that is March or boundary land); and from the establishment by him of a margraviate in this new province the present empire took its rise. The present imperial family descends from Rudolph von Hapsburg, and the house of Hapsburg furnished 24 sovereigns from Albert I. (1282) to Maria Theresa (1740). With the marriage of the latter to Stephen, Duke of Lorraine, the house of Hapsburg-Lorraine acceded to the throne in the person of Joseph III. in 1780. The succession then fell to Leopold II. (1790), Franz I. (1792), Ferdinand I. (1835), and Franz Joseph I., the present emperor (1848).

In the troubled period following the French revolution of 1830 insurrections took place in Modena, Parma, and the Papal States (1831-32), but were suppressed without much difficulty; and though professedly neutral during the Polish insurrections Austria clearly showed herself on the side of Russia, with whom her relations became more intimate as those between Great Britain and France grew more cordial. The death of Francis I. (1835) and accession of his son Ferdinand I. made little change in the Austrian system of government, and much discontent was the consequence. In 1846 the failure of the Polish insurrection led to the incorporation of Cracow with Austria. In Italy the declarations of Pio Nono in favor of reform increased the difficulties of Austria, and in Hungary the opposition under Kossuth and others assumed the form of a great constitutional movement. In 1848, when the expulsion of Louis Philippe shook all Europe, Metternich found it impossible any longer to guide the helm of the state, and the government was compelled to admit a free press and the right of citizens to arms. Apart from the popular attitude in Italy and in Hungary, where the diet declared itself permanent under the presidency of Kossuth, the insurrection made equal progress in Vienna itself, and the royal family, no longer in safety, removed to Innsbruck. After various ministerial changes the emperor abdicated in favor of his nephew, Francis Joseph; more vigorous measures were adopted; and Austria, aided by Russia, reduced Hungary to submission.

The year 1855 is memorable for the Concordat with the pope, which put the educational and ecclesiastical affairs of the empire entirely into the hands of the Papal see. In 1859 the hostile intentions of France and Sardinia against the possessions of Austria in Italy became so evident that she declared war by sending an army across the Ticino; but after disastrous defeats at Magenta and Solferino she was compelled to cede Milan and the northwest portion of Lombardy to Sardinia. In 1864 she joined with the German states in the war against Denmark, but a dispute about Schleswig-Holstein involved her in a war with her allies (1866), while at

the same time Italy renewed her attempts for the recovery of Venice. The Italians were defeated at Custozza and driven back across the Mincio; but the Prussians, victorious at Königgrätz (or Sadowa), threatened Vienna. Peace was concluded with Prussia on Aug. 23 and with Italy on Oct. 3, the result of the war being the cession of Venetia through France to Italy and the withdrawal of Austria from all interference in the affairs of Germany.

Since 1866 Austria has been occupied chiefly with the internal affairs of the empire. Hungarian demands for self-government were finally agreed to, and the Empire of Austria divided into the two parts already mentioned—the Cisleithan and the Transleithan. This settlement was consummated by the coronation of the Emperor Francis Joseph I., at Budapest, as King of Hungary, on the 8th of June, 1867. In the same year the Concordat of 1855 came up for discussion, and measures were passed for the reestablishment of civil marriage, the emancipation of schools from the domination of the church, and the placing of different creeds on a footing of equality. The fact of the Austro-Hungarian dominions comprising so many different nationalities has always given the central government much trouble, both in regard to internal and to external affairs. In regard to the "Eastern Question," for instance, the action of Austria has been hampered by the sympathies shown by the Magyars for their blood relations, the Turks, while the Slavs have naturally been more favorable to Russia. During the war between Russia and Turkey in 1877-78 Austria remained neutral; but at its close, in the middle of 1878, it was decided, at the Congress of Berlin, that the provinces of Bosnia and Herzegovina should in future be administered by Austria-Hungary instead of Turkey. Since that time the external history of the Austro-Hungarian monarchy has been uneventful, but in internal affairs there has been considerable friction between the different nationalities and the numerous political parties. The language question has been a fruitful source of controversy.

**AUTOCRAT**, an absolute or uncontrolled ruler; the head of a state who is not controlled by any constitutional limitations; such as the Emperor of Russia.

**AUTO DE FE** (Spanish); **AUTO DA FE** (Portuguese), lit. "act of faith." See Inquisition.

**AUTOGRAPH**, a person's own handwriting; an original manuscript or signature, as opposed to a copy. The practice of collecting autographs or signatures dates at least from the 16th century, among the earliest collections known being those of Loménie de Brienne and Lacroix du Maine.

**AUTOMATON**, a self-moving machine performing actions like those of a living being, and often shaped like one. The walking statues of Dædalus, the flying dove of Archytas, the brazen head of Friar Bacon, the iron fly of Regiomontanus, the door-opening figure of Albertus Magnus, the parading knights of the clock presented to Charlemagne by Harun al Rashid, the toy carriage and



attendants constructed by Camus for Louis XIV., the flute-player, tambour-player, and duck of Vaucanson, and the writing child of the brothers Droz are among the more noteworthy of traditional automata.

**AUTOMOBILE** (a-tō-mō-bēl'), a self-propelling vehicle for use on streets or roads for conveying passengers or freight. The earliest automobile was the crude vehicle invented by the Englishman, Hancock, and patented in 1827. Other early automobile inventors, none of whom, however, were successful, were Sir Charles Dance, Guldeworthy Gurney, W. A. Summers, Nathaniel Ogle, Macerone and Squire, Henry James, Scott Russell, and Robert Griffith, whose patents date between 1827 and 1836. These inventions were regarded as curiosities only, and it was not until 1885 when Gottlieb Daimler invented his small powerful gas-engine that the modern automobile became possible.

The first American self-propelling road vehicle was made by Oliver Evans in 1786, at which time he planned a steam wagon that could be made to transport merchandise at less expense than the same work could be done by horses.

It was not, however, until recent years, that any widespread interest was manifested in the subject of horseless vehicles. All such machines may be classified, according to their motor power, under the following general heads: 1. Steam vehicles with boilers and engines burning coal, oil, etc. 2. Machines driven by oil or vapor engines, gasoline, naphtha, etc. 3. Machines driven by compressed air (liquid air being a possibility.) 4. Machines run by electricity.

The equipment of the modern electric automobile consists of a storage battery for supplying the current, the motor for transforming this current into mechanical power, and the controller for regulating the speed of the motor. In most electric vehicles two motors or a double motor drive are employed, the motor being either supported on the rear axle or on the reach. The battery is either placed in a case hung under the body of the vehicle or else inside the body. The motors and other moving parts are placed in dust-proof cases. The efficiency of the battery is of course the most important consideration, and its deterioration with service has to be borne in mind in such commercial applications as automobiles. In 1908 the batteries then in use were considered to be good for 5000 miles by observing ordinary precautions in charging and use. In the United States electric power has been applied to a great variety of vehicles, including, besides pleasure carriages of various types, delivery wagons, cabs, omnibuses, and trucks.

Since 1900 in the United States 20-passenger omnibuses and heavy trucks with double electric motor drives have been constructed and are in active use.

The most popular motor is some form of oil engine. The number and variety of these motors makes de-

scription of them impossible. In the internal combustion motor the propulsive power is given to the piston by the explosion of vaporized oil, such as benzine or gasoline in the cylinder. The mechanism comprises, besides the engine and its connections, a carbureter for vaporizing and feeding the oil to the cylinder, and a cooler, by which water is kept in circulation around the cylinder. The engine transmits its power to a crank-shaft, from which it is led off by a chain drive or gearing to the driving shaft of the vehicle. These motors are made with one, two and four cylinders, and are of various powers. They will not start up of themselves under load, and cannot be reversed. Backing the carriage is effected by gears, and a steady movement of the engine is produced by a fly-wheel. The gasoline motor is unable to run under overload, but on the other hand consumes less fuel, and on this account has a greater radius of action.

The speed attained by the automobiles has been and is being enormously increased, and it is in this respect that there have been the most remarkable developments. These have progressed from time to time, so that at present the horseless carriage rivals modern express trains in the speed of its travel, while it is also able to operate for long distances, requiring supplies of fuel and water in a manner similar to the railway locomotive. If a machine is constructed to run comparatively short distances on a level and well-surfaced road, a mile may be accomplished in from 40 to 60 seconds.

The years 1907 and 1908 were the most successful in the history of the automobile industry. There were in use in the United States 175,000 pleasure vehicles of various models and horse power and 18,000 commercial vehicles, both gasoline and electric. The estimated valuation of all types of motor-driven vehicles in use is \$370,000,000.

The estimated production of automobiles of the entire industry in the United States is placed at 55,000 machines. The approximate value of this output is \$110,000,000. The capital employed in the automobile industry is approximately \$90,000,000.

There are about fifty companies engaged exclusively or partially in the manufacture of motor vehicles for business purposes. A decided change is noticeable in the attitude of those who are using horses in their business toward the possible adoption of the motor. The failure of some of the earliest installations, owing largely to exorbitant claims made for them, somewhat retarded the development for a time, but the prejudice so born has been largely overcome, and with the much improved vehicle and the more rational demands as to what it should do, the machine is beginning steadily to replace the animal as it has in every field where they have come in conflict so far, and naturally always will. The much greater working capacity of the motor vehicle—owing to its speed and ability to work for indefinite periods of time—is its chief advantage.

Economy of use usually results through this feature rather than through reduced cost of operation, although the relative value of the latter item increases rapidly in favor of the motor with the number of vehicles employed, it being capable of displacing a greater number of horse-drawn vehicles. It is generally conceded by those who should know that the best field for the electric commercial vehicle is in the lines where the length of the runs to be made is relatively short and the number of stops great. The gasoline vehicle is coming rapidly to the front in all other lines, and, in many cases, is doing well in this one, too. Very little has been done with steam, except that one company has built a number of ambulances, although it seems to have great possibilities.

The taximeter cab service now in operation in the large cities opens a new field for the American automobile. These motor cabs will carry taximeters to determine the fares, and promise to be popular throughout the country, and seems destined to shortly replace the horse-drawn cab.

Federal statistics show there are more than 2,151,570 miles of public highways in the United States. Of this mileage 108,232.9 miles are surfaced with gravel, 38,621.7 miles with stone, and 6,809.7 miles with special materials, such as shells, sand, clay, oil and brick, making in all 153,664.3 miles of improved road. From this it follows that 7.14 per cent, of all the roads in this country have been improved.

Automobile speed may be judged by a study of the record table which shows that the fastest mile ever recorded is the :28 1-5 made by F. H. Marriott in a Stanley steamer at Ormond, Fla., in 1906. The fastest average pace for a middle-distance race was made at Ormond, March 5, 1908, when Maurice Bernin, in a sixty-horse power Renault, traveled 100 miles in 1:12:56 1-5, an average of 82.26 miles per hour. At the same meet Emanuel Cedrino, in the sixty-horse power Fiat Cyclone, established a 300-mile record of 3:53:44, an average of 77.02 miles per hour. Greater speed than even this is reported to have been made by Nazzaro in a Fiat in a match race at Brooklands, England, it being said he showed 120 miles an hour for two and three-quarter miles, but these figures never were officially accepted. On the road the fastest average pace was made in the Florio cup race in Italy, in 1908, by Nazzaro in a Fiat, who averaged 74.27 miles per hour.

The world's record for twenty-four hours is 1,581 miles 1,310 yards, an average pace of 65.9 miles an hour, made June 23-29, 1907, by S. F. Edge in a six-cylinder Napier on the three and one-quarter mile cement track at Weybridge, England. During the year there were run in the United States ten twenty-four-hour races, five of them single car events and the other five relay or team races in which two cars of the same make constituted a team.

Motor-bicycles and quadricycles were built in New York in 1895. Gasoline





Fourteen-passenger omnibus.



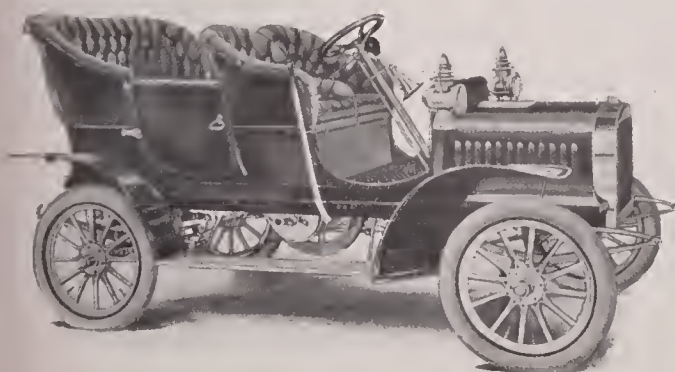
Runabout.



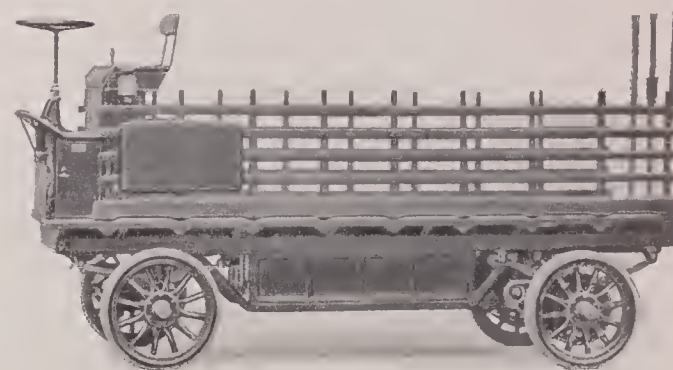
Victoria phaeton.



30-35 horse-power landaulet.



Touring car.



Electric truck,  $3\frac{1}{2}$  tons capacity.







motors provided the propelling force. The former weighs only sixty pounds. A naphtha tank is fastened on top of the frame between the saddle and the handles. It feeds down through the frame to the cylinders, one on each side of the rear wheel. The drops of naphtha are exploded by an electric spark from a small battery hung to the frame, thus giving impulse to the pistons. The speed depends upon the amount of oil let down. The machine is started by pedals, and the rotation of the wheels, together with the turning of the switch, sets the motor to working.

**AUTONOMY**, the power of a state, institution, etc., to legislate for itself.

**AUTOP'SY**, literally, personal observation or inspection, commonly restricted to post-mortem examination.

**AUTOSUGGESTION**, in hypnotism, the power of suggesting thought or action to one's self. It is used largely in medicine under the name suggestive therapeutics, by which the patient, being given an inert remedy, suggests a cure to himself.

**AUTOTYPE**, a species of photographic print. A thin sheet of gelatine on paper is rendered sensitive to light by treatment with bichromate of potash, and then exposed under an ordinary photographic negative. The portions of gelatine affected by the light become insoluble, the remainder of the gelatine is then washed away, and the picture remains reproduced in the gelatine, there being slight elevations and depressions corresponding with the distribution of light and shade. This may be printed from, but it is more often made use of to obtain electrotypes or other reverses, from which impressions can more easily be taken.

**AUTUMN**, the season between summer and winter, in the northern hemisphere often regarded as embracing August, September, and October, or three months about that time. The beginning of the astronomical autumn is September 22, the autumnal equinox; and the end is December 21, the shortest day. The autumn of the southern hemisphere takes place at the time of the northern spring.

**AUTUN** ô-tün; ancient *Bibracte*, later *Augustodunum*) a town, South-eastern France, department of Saône-et-Loire. It has two Roman gates of exquisite workmanship, the ruins of an amphitheater and of several temples, the cathedral of St. Lazare, a fine Gothic structure of the eleventh century; manufactures of carpets, woollens, cotton, velvet, hosiery, etc., Pop. 14,066.

**AUVERGÈNE** (ô-vâr-nyê), a province, Central France, now merged into departments Cantal and Puy-de-Dôme, and an arrondissement of Haute-Loire. The Auvergne Mountains, separating the basins of the Allier, Cher and Creuse from those of the Lot and Dordogne, contain the highest points of Central France: Mount Dor, 6188 feet; Capital, 6093 feet, and Puy-de-Dôme, 4806 feet. The number of extinct volcanoes and general geologic formation make the district one of great scientific interest. The minerals include iron, coal, copper and lead, and there are warm and cold mineral

springs. Auvergne contributes a large supply to the labor markets of Paris and Belgium, there being in Paris alone some 50,000 Auvergnats.

**AUXERRE** (ô-sâr), a town, France, department of Yonne, 110 miles south-east of Paris, Principal edifices: A fine Gothic cathedral, unfinished; the abbey of St. Germain, with curious crypts; and an old Episcopal palace, now the Hotel de-Prefecture; it manufactures woollens, hats, casks, leather, earthen ware, violin strings, etc.; trade chiefly in wood and wines, of which the best known is white Chablis. Pop. 20,236.

**AUXOM'ETER**, an instrument to measure the magnifying powers of an optical apparatus.

**AUXONNE** (ô-son; anc. *Aussona*) a town, France, department of Côte-d'Or (Burgundy), on the Saône; a fortified place with some manufactures. Pop. 5911.

**AVA**, a town in Asia, formerly the capital of Burmah, on the Irrawady, now almost wholly in ruins.

**AVA-AVA**, *ARVA*, *KAVA* or *YAVA*, plant of the nat. order Piperaceæ (pepper family), so called by the inhabitants of Polynesia, who make an intoxicating drink out of it. Its leaves are chewed with betel in Southeastern Asia.

**AV'ALANCHES**, large masses of snow or ice precipitated from the mountains, and distinguished as wind or dust avalanches, when they consist of fresh-fallen snow whirled like a dust storm into the valleys; as sliding avalanches, when they consist of great masses of snow sliding down a slope by their own weight; and as glacier or summer avalanches, when ice-masses are detached by heat from the high glaciers.

**AVELLINO** (â-vel-lé-nô), a town in southern Italy, capital of the province of Avellino, 29 miles east of Naples, the seat of a bishop. Avellino nuts were celebrated under the Romans. Pop. 16,376.—Area of the province, 1409 sq. miles; pop. 419,688.

**A'VE MARI'A**, the first two words of the angel Gabriel's salutation (Luke i. 28), and the beginning of the very common Latin prayer to the Virgin in the Roman Catholic Church. Its lay use was sanctioned at the end of the 12th century, and a papal edict of 1326 ordains the repetition of the prayer thrice each morning, noon, and evening, the hour being indicated by sound of bells called the Ave Maria or Angelus Domini. The prayers are counted upon the small beads of the rosary, as the Paternosters are upon the largest ones.

**AVERAGE**, in maritime law, any charge or expense over and above the freight of goods, and payable by their owner.—*General average* is the sum falling to be paid by the owners of ship, cargo and freight, in proportion to their several interests, to make good any loss or expense intentionally incurred for the general safety of ship and cargo, e. g. throwing goods overboard, cutting away masts, port dues in cases of distress, etc.—*Particular average* is the sum falling to be paid for unavoidable loss when the general safety is not in question, and therefore chargeable on the individual owner of the property lost. A policy of insurance generally

covers both general and particular average, unless specially excepted.

**AVESTA**. See *Zendavesta*.

**AVEYRON** (â-vâ-rôn), a department occupying the southern extremity of the central plateau of France, traversed by mountains belonging to the Cevennes and the Cantal ranges; principal rivers, Aveyron, Lot, and Tarn, the Lot alone being navigable. The climate is cold, and agriculture is in a backward state, but considerable attention is paid to sheep-breeding. It is noted for its "Roquefort cheese." It has coal, iron and copper mines, besides other minerals. Area, 3340 sq. miles; capital, Rhodéz. Pop. 377,559.

**AVIGNON** (â-vê-nyôn), an old town of s.e. France, capital of department Vaucluse, on the left bank of the Rhone; inclosed by lofty battlemented and turreted walls, well built, but with rather narrow streets. The silk manufacture and the rearing of silk-worms are the principal employments in the district. Here Petrarch lived several years, and made the acquaintance of Laura, whose tomb is in the Franciscan church. From 1309 to 1376 seven popes in succession, from Clement V. to Gregory XI., resided in this city. After its purchase by Pope Clement VI. in 1348 Avignon and its district continued, with a few interruptions, under the rule of a vice-legat of the pope's till 1791, when it was formally united to the French Republic. Pop. 46,209.

**AVILA** (â-vê-lâ), town of Spain, capital of province of Avila, a modern division of Old Castile. Pop., town, 11,885; province, 197,164.

**AV'OSET**, a bird about the size of a lapwing. The bill is long, slender, elastic, and bent upward toward the tip, the legs long, the feet webbed, and the plumage variegated with black and



Avoset.

white. The bird feeds on worms and other small animals, which it scoops up from the mud of the marshes and fens that it frequents. It is found in Europe, Asia, Africa, and America; but the American species is slightly different from the other.

**AX**, or **AXE**, a well-known tool for cutting or chipping wood, consisting of an iron head with an arched cutting edge of steel, which is in line with the wooden handle of the tool, and not at right angles to it as in the adz.

**AX'ION**, a universal proposition, which the understanding must perceive to be true as soon as it perceives the meaning of the words, and therefore called a self-evident truth: e.g., A is A. In mathematics axioms are those propositions which are assumed without proof, as being in themselves independ-



ent of proof, and which are made the basis of all the subsequent reasoning; as, "The whole is greater than its part"; "Things that are equal to the same thing are equal to one another."

**AXIS**, the straight line, real or imaginary, passing through a body or magnitude, on which it revolves, or may be supposed to revolve; especially a straight line with regard to which the different parts of a magnitude, or several magnitudes, are symmetrically arranged; e.g., the axis of the world, the imaginary line drawn through its two poles.

In botany the word is also used, the stem being termed the ascending axis, the root the descending axis.

In anatomy the name is given to the second vertebra from the head, that on which the atlas moves. See Atlas.

**AYE-AYE** (ī), an animal of Madagascar, so called from its cry, now referred to the lemur family. It is about the size of a hare, has large flat ears and a bushy



Aye-aye.

tail; large eyes; long sprawling fingers, the third so slender as to appear shriveled; color, musk-brown, mixed with black and gray ash; feeds on grubs, fruits, etc.; habits, nocturnal.

**AYR** (ār), a town of Scotland, a royal and parl. burgh, and capital of Ayrshire, at the mouth of the river Ayr, on the Firth of Clyde. The house in which Burns was born stands within 1½ miles of the town, between it and the church of Alloway ("Alloway's auld haunted kirk"), and a monument to him stands on a height between the kirk and the bridge over the Doon. Pop. 28,697.—The county has a length along the Firth of Clyde and North Channel of 80 miles;

area, 735,262 acres. It is divided into the districts of Carrick in the south, Kyle in the middle, and Cunningham in the north. Chief towns, Ayr, Kilmar-nock, and Irvine. North Ayrshire and South Ayrshire each returns one member to parliament. Pop. (1901), 254,436.

**AZA'LEA**, a genus of plants remarkable for the beauty and fragrance of their flowers, and distinguished from the rhododendrons chiefly by the flowers having five stamens instead



Azalea.

of ten. Many beautiful rhododendrons with deciduous leaves are known under the name of azalea in gardens. The azaleas are common in North America.

**AZAMGARH**, a town of India, United Provinces, capital of dist. of same name. Pop. 18,528.—The district has an area of 2418 sq. miles; a pop. of 1,728,625.

**AZERBIJAN** (ā-zer-bi-jān'), a province of northwestern Persia; area, 40,000 sq. miles; pop. estimated at 2,000,000. It consists generally of lofty mountain ranges, some of which rise to a height of between 12,000 and 13,000 feet. Principal rivers: the Aras or Araxes, and the Kizil-Uzen, which enter the Caspian; smaller streams discharge themselves within the province into the great salt lake of Urumiyah.

**AZORES** (a-zōrz' or a-zō'res) or **WEST-ERN ISLANDS**, a group belonging to and 900 miles west of Portugal, in the North Atlantic Ocean. The total area is about 900 sq. miles; São Miguel (containing the capital Ponta Delgada), Pico, and Terceira are the largest. The islands, which are volcanic and subject to earthquakes, are apparently of comparatively

recent origin, and are conical, lofty, precipitous, and picturesque. The most remarkable summit is the peak of Pico, about 7600 feet high. There are numerous hot springs. They are covered with luxuriant vegetation, and diversified with woods, corn-fields, vineyards, lemon and orange groves, and rich open pastures. When first visited they were uninhabited, and had scarcely any other animals except birds, particularly hawks, to which, called in Portuguese açores, the islands owe their name. Pop. 256,615.

**AZ'TECS**, a race of people who settled in Mexico early in the 14th century, ultimately extended their dominion over a large territory, and were still extending their supremacy at the time of the arrival of the Spaniards, by whom they were speedily subjugated. Their most celebrated ruler was Montezuma, who was reigning when the Spaniards arrived, about the middle of the 15th century. It is inferred that considerable numbers of them lived in large communal residences, and that land was held and cultivated upon the communal principle. Slavery and polygamy were both legitimate, but the children of slaves were regarded as free. Although ignorant of the horse, ox, etc., they had a considerable knowledge of agriculture, maize and the agave being the chief produce. Silver, lead, tin, and copper were obtained from mines, and gold from the surface and river beds, but iron was unknown to them, their tools being of bronze and obsidian. In metal-work, feather-work, weaving, and pottery, they possessed a high degree of skill. To record events they used an unsolved hieroglyphic writing, and their lunar calendars were of unusual accuracy. Two special deities claimed their reverence: Hintzilopochtli, the god of war, propitiated with human sacrifices; and Quetzalcoatl, the beneficent god of light and air, with whom at first the Aztecs were disposed to identify Cortez. Their temples, with large terraced pyramidal bases, were in the charge of an exceedingly large priesthood, with whom lay the education of the young. As a civilization of apparently independent origin, yet closely resembling in many features the archaic oriental civilizations, the Aztec civilization is of the first interest, but in most accounts of it a large speculative element has to be discounted.

## B

**B** is the second letter and the first consonant in the English and most other alphabets. It is a mute and labial, pronounced solely by the lips, and is distinguished from p by being sonant, that is, produced by the utterance of voice as distinguished from breath.

**B**, in music, the seventh note of the model diatonic scale or scale of C. It is called the leading note, as there is always a feeling of suspense when it is sounded until the key-note is heard.

**BA'AL**, **BEL**, a Hebrew and general Semitic word, which originally appears

to have been generic, signifying simply lord, and to have been applied to many different divinities, or, with qualifying epithets, to the same divinity regarded in different aspects and as exercising different functions. Thus in Hos. ii. 16 it is applied to Jehovah himself, while Baal-berith (the Covenant-lord) was the god of the Shechemites, and Baal-zebub (the Fly-god) the idol of the Philistines at Ekron.

**BABBITT**, Isaac, an American inventor, born in Massachusetts in 1799, died 1862. He invented the amalgam known as Babbitt metal, for which con-

gress gave him a grant of \$20,000 and a gold medal.

**BABBITT-METAL**, a soft metal resulting from alloying together certain proportions of copper, tin, and zinc or antimony, used with the view of as far as possible obviating friction in the bearings of journals, cranks, axles, etc., invented by Isaac Babbitt (1799-1862), a goldsmith of Taunton, Massachusetts.

**BABCOCK**, James Francis, an American chemist, born in Boston in 1844, died there in 1897. His principal distinction, aside from his teaching career,



was his invention of a useful fire-extinguisher.

**BABCOCK**, Stephen Moulton, an American chemist, born in New York in 1843. He invented the Babcock milk-tester, which he did not patent, so that its benefits would be free to the public. In 1893 he was made professor of agricultural chemistry in the University of Wisconsin.

**BA'BEL, TOWER OF**, according to the 11th chapter of Genesis, a structure in the Plain of Shinar, Mesopotamia, commenced by the descendants of Noah subsequent to the deluge, but which was not allowed to proceed to completion. It has commonly been identified with the great temple of Belus or Bel that was one of the chief edifices in Babylon, and the huge mound called Birs Nimrud is generally regarded as its site, though another mound, which to this day bears the name of Babil, has been assigned by some as its site. Babel means literally "gate of God." The meaning "confusion" assigned to it in the Bible really belongs to a word of similar form. See Babylon.

**BABOON**, a common name applied to a division of old-world apes and monkeys. They have elongated abrupt muzzles like a dog, strong tusks or canine teeth, usually short tails, cheek-



Baboon mother and infant.

pouches, small deep eyes with large eyebrows, and naked callosities on the buttocks. Their hind and fore feet are well proportioned, so that they run easily on all fours, but they do not maintain themselves in an upright posture with facility. They are generally of the size of a moderately large dog, but the largest, the mandrill, is, when erect, nearly of the height of a man. They are almost all African, ugly, sullen, fierce, lascivious, and gregarious, defending themselves by throwing stones, dirt, etc. They live on fruits and roots, eggs and insects.

**BABYLON**, the capital of Babylonia, on both sides of the Euphrates, one of the largest and most splendid cities of the ancient world, now a scene of ruins, and earth-mounds containing them. Babylon was a royal city sixteen hundred years before the Christian era; but the old city was almost entirely destroyed in 683 B.C. A new city was built by Nebuchadnezzar nearly a century later. This was in the form of a square, each

side 15 miles long, with walls of such immense height and thickness as to constitute one of the wonders of the world. It contained splendid edifices, large gardens and pleasure-grounds, especially the "hanging-gardens," a sort of lofty terraced structure supporting earth enough for trees to grow, and the celebrated tower of Babel or temple of Belus, rising by stages to the height of 625 feet. After the city was taken by Cyrus in 538 B.C., and Babylonia made a Persian province, it began to decline, and had suffered severely by the time of Alexander the Great. He intended to restore it, but was prevented by his death, which took place here in 323 B.C., from which time its decay was rapid. Interesting discoveries have been made on its site in recent times, more especially of numerous and valuable inscriptions in the cuneiform or arrow-head character. The modern town of Hillah is believed to represent the ancient city, and the plain here for miles round is studded with vast mounds of earth and brick and imposing ruins. The greatest mound is Birs Nimrud, about 6 miles from Hillah. It rises nearly 200 feet, is crowned by a ruined tower, and is commonly believed to be the remains of the ancient temple of Belus. Another great ruin-mound, called Mujellibeh, has also been assigned as its site.

**BABYLONIA**, an old Asiatic empire occupying the region watered by the lower course of the Euphrates and the Tigris, and by their combined stream. The inhabitants, though usually designated Babylonians, were sometimes called Chaldeans, and it is thought that the latter name represents a superior caste who at a comparatively late period gained influence in the country. At the earliest period of which we have record the whole valley of the Tigris and Euphrates was inhabited by tribes of Turanian or Tatar origin. Along with these, however, there early existed an intrusive Semitic element, which gradually increased in number till at the time the Babylonians and Assyrians (the latter being a kindred people) became known to the western historians they were essentially Semitic peoples. The great city Babylon (which see), or Babel, was the capital of Babylonia, which was called by the Hebrews Shinar. The country was, as it still is, exceedingly fertile, and must have anciently supported a dense population. The chief cities, besides Babylon, were Ur, Calneh, Erech, and Sippara. Babylonia and Assyria were often spoken of together as Assyria.

The discovery and interpretation of the cuneiform inscriptions have enabled the history of Babylonia to be carried back to about 4000 B.C., at which period the inhabitants had attained a considerable degree of civilization, and the country was ruled by a number of kings or princes each in his own city. About 2700 B.C. Babylonia came under the rule of a single monarch. Latterly it had serious wars with neighboring nations, and for several hundred years previous to 2000 B.C. Babylonia was subject to the neighboring Elam. It then regained its independence, and for a thousand years it was the foremost state of west-

ern Asia in power, as well as in science, art, and civilization. The rise of the Assyrian empire brought about the decline of Babylonia, which latterly was under Assyrian domination, though with intervals of independence. Tiglath-Pileser II. of Assyria (745-727) made himself master of Babylonia; but the conquest of the country had to be repeated by his successor, Sargon, who expelled the Babylonian king, Merodach-baladan, and all but finally subdued the country, the complete subjugation being effected by Sennacherib. After some sixty years the second or later Babylonian empire arose under Nabopolassar, who, joining the Medes against the Assyrians, freed Babylon from the superiority of the latter power, 625 B.C. The new empire was at its height of power and glory under Nabopolassar's son, Nebuchadnezzar (604-561), who subjected Jerusalem, Tyre, Phœnicia, and even Egypt, and carried his dominion to the shores of the Mediterranean and northward to the Armenian mountains. The capital, Babylon, was rebuilt by him, and then formed one of the greatest and most magnificent cities the world has ever seen. He was succeeded by his son Evil-merodach, but the dynasty soon came to an end, the last king being Nabonetus or Nabonadius, who came to the throne in B.C. 555, and made his son, Belshazzar, co-ruler with him. Babylon was taken by Cyrus the Persian monarch in 538, and the second Babylonian empire came to an end, Babylonia being incorporated in the Persian empire. Its subsequent history was similar to that of Assyria.

**BABYLONISH CAPTIVITY**, a term usually applied to the deportation of the two tribes of the kingdom of Judah to Babylon by Nebuchadnezzar, 585 B.C. The duration of this captivity is usually reckoned seventy years, though strictly speaking it lasted only fifty-six years. A great part of the ten tribes of Israel had been previously taken captive to Assyria.

**BABYROUSSA** (bab-i-rus'á), a species of wild hog, a native of the Indian Archipelago. From the outside of the upper jaw spring two teeth 12 inches long, curving upward and backward



Babyroussa.

like horns, and almost touching the forehead. The tusks of the lower jaw also appear externally, though they are not so long as those of the upper jaw. Along the back are some weak bristles, and on the rest of the body only a sort of wool. These animals live in herds, feed on herbage, are



sometimes tamed, and their flesh is well flavored.

**BAC'CARAT**, a gambling game of French origin, played by any number of players, or rather betters, and a banker. The latter deals two cards to each player and two to himself, and covers the stakes of each with an equal sum. The cards are then examined, and according to the scores made the players take their own stake and the banker's, or the latter takes all or a certain number of the stakes.

**BACCHANA'LIA**, feasts in honor of Bacchus, characterized by licentiousness and revelry, and celebrated in ancient Athens. In the processions were bands of Bacchantes of both sexes, who, inspired by real or feigned intoxication, wandered about rioting and dancing. They were clothed in fawn-skins, crowned with ivy, and bore in their hands thyrsi, that is spears entwined with ivy, or having a pine-cone stuck on the point. These feasts passed from the Greeks to the Romans, who celebrated them with still greater dissoluteness till the senate abolished them B.C. 187.

**BACCHUS** (bak'us), the god of wine, son of Zeus (Jupiter) and Sēmēlē. He first taught the cultivation of the vine and the preparation of wine. To spread the knowledge of his invention he traveled over various countries and received in every quarter divine honors. Drawn by lions (some say panthers, tigers, or lynxes), he began his march, which resembled a triumphal procession. Those who opposed him were severely punished, but on those who received him hospitably he bestowed rewards. His love was shared by several; but Ariadne, whom he found deserted upon Naxos, alone was elevated to the dignity of a wife, and became a sharer of his immortality.

**BACH** (bâh), Johann Sebastian, one of the greatest of German musicians, was born in 1685, at Eisenach; died in 1750, at Leipzig. Being the son of a musician he was early trained in the art, and soon distinguished himself. In 1703 he was engaged as a player at the court of Weimar, and subsequently he was musical director to the Duke of Anhalt-Köthen, and latterly held an appointment at Leipzig. He paid a visit to Potsdam on the invitation of Frederick the Great. As a player on the harpsichord and organ he had no equal among his contemporaries; but it was not till a century after his death that his greatness as a composer was fully recognized. His compositions breathe an original inspiration, and are largely of the religious kind. They include pieces, vocal and instrumental, for the organ, piano, stringed and keyed instruments; church cantatas, oratorios, masses, passion music, etc.

**BACH'ELOR**, a term applied anciently to a person in the first or probationary stage of knighthood who has not yet raised his standard in the field. It also denotes a person who has taken the first degree in the liberal arts and sciences, or in divinity, law, or medicine, at a college or university; or a man of any age who has not been married.

**BACHELOR'S DEGREE**, an academic degree given at the end of the first stage of collegiate education, preliminary to the master's or doctor's degree. A.B. is the abbreviation of bachelor of arts, S.B. of bachelor of science, Ph.B. of bachelor of philosophy, LL.B. of bachelor of laws, D.B. of bachelor of divinity, Litt.B. of bachelor of letters, and so on.

**BACHELOR'S BUTTONS**, the double-flowering buttercup, with white or yellow blossoms, common in gardens.

**BACIL'LUS**, the name applied to certain minute rod-like microscopic organisms (Bacteria) which often appear in putrefactions, and one of which is believed to hold a constant causative relation to tubercule in the lung, and to be present in all cases of phthisis. Others are alleged to be connected with anthrax, typhoid fever, erysipelas, etc. See Bacteria.

**BACKGAM'MON**, a game played by two persons upon a table or board made for the purpose, with pieces or men, dice-boxes, and dice. The table is in two parts, on which are twenty-four black and white spaces called points. Each player has fifteen men of different colors for the purpose of distinction. The movements of the men are made in accordance with the numbers turned up by the dice.

**BACON**, Delia Salter, an American author and a conspicuous contributor to the literature in which is discussed the probability that Sir Francis Bacon was the author of Shakespeare's plays. She was born in Ohio in 1811 and died in London in 1859. She published several stories, and in 1857 the *Philosophy of the Plays of Shakespeare Unfolded*, for which Nathaniel Hawthorne wrote the preface.

**BACON**, Francis, Baron of Verulam, Viscount St. Albans, and Lord High Chancellor of England; was born at London in 1561, died at Highgate in



Francis Bacon.

1626. He was educated at Trinity College, Cambridge, and in 1575 was admitted to Gray's Inn. In 1584 he became member of parliament for Melcombe Regis, and soon after drew up a Letter of Advice to Queen Elizabeth, an able political memoir. In 1586 he was

member for Taunton, in 1589 for Liverpool. A year or two after he gained the Earl of Essex as a friend and patron. Bacon's talents and his connection with the lord-treasurer Burleigh, who had married his mother's sister, and his son Sir Robert Cecil, first secretary of state, seemed to promise him the highest promotion; but he had displeased the queen, and when he applied for the attorney-generalship, and next for the solicitor-generalship (1595), he was unsuccessful. Essex endeavored to indemnify him by the donation of an estate in land. Bacon, however, forgot his obligations to his benefactor, and not only abandoned him as soon as he had fallen into disgrace, but without being obliged took part against him on his trial, in 1601, and was active in obtaining his conviction. He had been chosen member for the county of Middlesex in 1593, and for Southampton in 1597, and had long been a queen's counsel. The reign of James I. was more favorable to his interest. He was assiduous in courting the king's favor, and James, who was ambitious of being considered a patron of letters, conferred upon him in 1603 the order of knighthood. In 1604 he was appointed king's counsel; in 1606 he married; in 1607 he became solicitor-general, and six years after attorney-general. In 1617 he was made lord-keeper of the seals; in 1618 Lord High Chancellor of England and Baron Verulam. In this year he lent his influence to bring a verdict of guilty against Raleigh. In 1621 he was made Viscount St. Albans. Soon after this his reputation received a fatal blow. A new parliament was formed in 1621, and the lord-chancellor was accused before the house of bribery, corruption, and other malpractices. It is difficult to ascertain the full extent of his guilt; but he seems to have been unable to justify himself, and handed in a "confession and humble submission," throwing himself on the mercy of the Peers. In 1597 he published his celebrated *Essays*, which immediately became very popular, were successively enlarged and extended, and translated into Latin, French, and Italian. The treatise on the *Advancement of Learning* appeared in 1605; *The Wisdom of the Ancients* in 1609; his great philosophical work, the *Novum Organum*, in 1620; and the *De Augmentis Scientiarum*, a much enlarged edition of the *Advancement*, in 1623. His *New Atlantis* was written about 1614-17; *Life of Henry VII.* about 1621. Bacon was great as a moralist, a historian, a writer on politics, and a rhetorician; but it is as the father of the inductive method in science, as the powerful exponent of the principle that facts must be observed and collected before theorizing, that he occupies the grand position he holds among the world's great ones.

**BACON**, Nathaniel, an American colonist of Virginia. He was a remote cousin of Sir Francis Bacon, and educated for the law. He took part in the Indian wars of 1675-6, and was carried off by dysentery in the midst of political strife. He was born in 1648.

**BACON**, Roger, an English monk, and one of the most profound and original







# BACTERIA.



1



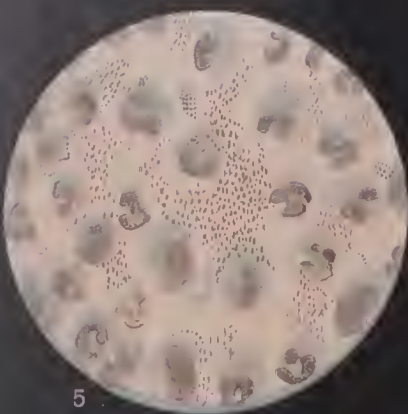
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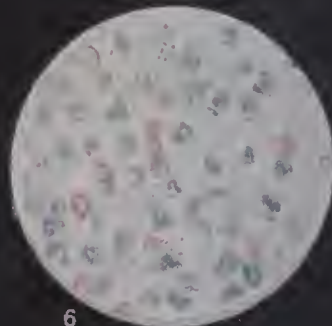
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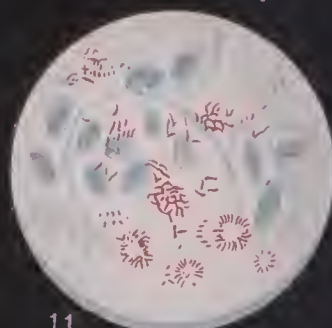
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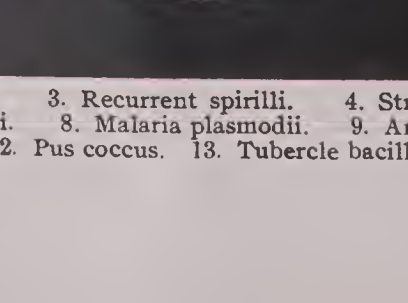
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12



13



14



15

1. Typhus bacilli. 2. Gono coccus. 3. Recurrent spirilli. 4. Strepto coccus. 5. Diphtheria bacilli.  
6. Pneumo coccus. 7. Comma bacilli. 8. Malaria plasmodii. 9. Anthrax bacillus. 10. Influenza bacilli.  
11. Leprosy bacillus. 12. Pus coccus. 13. Tubercle bacillus. 14. Bacterium coli.



thinkers of his day, was born about 1214, near Ilchester, Somersetshire; died at Oxford in 1294. His most important work is his *Opus Majus*, where he discusses the relation of philosophy to religion, and then treats of language, metaphysics, optics, and experimental science. He was undoubtedly the earliest philosophical experimentalist in Britain; he made signal advances in optics; was an excellent chemist; and in all probability discovered gunpowder. He was intimately acquainted with geography and astronomy, as appears by his discovery of the errors of the calendar, and their causes, and by his proposals for correcting them, in which he approached very near to truth.

**BACTERIA**, minute vegetable organisms, a few species of which are productive of disease when introduced into the animal organism. The vast majority of bacteria are harmless and many of them



A. 1, single bacilli; 2, bacilli, forming threads and developing spores. The bright oval body in the center of each bacillus is a spore. B. 1, ordinary form without spores; 2, with spores; 3, free spores; 4, a mass of spores. (After Klein.)

are useful to the human economy. Poisonous bacteria are called "pathogenic," or disease-producing; the innocuous ones are called "non-pathogenic." "Microbes," "disease germs," "micro-organisms," or simply "germs" are other names for bacteria. Bacteria abound everywhere. Millions of them exist in a glassful of ordinary drinking water. They stream through the purest kind of air and are drawn in and cast out with every breath. The atmosphere of cities especially is crowded with them, and it is a growing belief that all diseases are caused by their presence and multiplication in the body. Experiments, however, give the hope that most of these diseases will be conquered, as bacteriology develops methods of immunizing the human body to the multiplication of these organisms in the blood and other tissues. (See Antitoxin.) Bacteria are classified as bacilli, spirilli, and cocci. These names are used because they describe the shape of the different bacteria to which they are applied. Bacillus means a little rod, and bacilli are rod-shaped. Spirillum means a spiral, and spirilli are spiral-like, while coccus means a berry, and cocci are little round bodies. These three main divisions are subdivided into numerous species. The average size of bacteria is so small as to surpass comprehension. For example, 2000 of them in a row, side by side, would hardly stretch across the head of a pin. Pneumonia is caused by a coccus, tuberculosis by a bacillus, and bacteriology has positively proved that various other diseases are produced by these germs.

**BADAKSHAN'**, a territory of central Asia, tributary to the Amcer of Afghanistan. It has the Oxus on the north,

and the Hindu Kush on the south; and has lofty mountains and fertile valleys; the chief town is Faizabad. The inhabitants profess Mohammedanism. Pop. 100,000.

**BADEN** (bä'dën), Grand-duchy of, one of the more important states of the German Empire, situated in the s.w. of Germany, to the west of Württemberg. It is divided into four districts, Constance, Freiburg, Karlsruhe, and Mannheim; has an area of 5824 sq. miles, and a pop. of 1,866,584. It is mountainous, being traversed to a considerable extent by the lofty plateau of the Schwarzwald or Black Forest, which attains its highest point in the Feldberg (4904 feet). The nucleus of this plateau consists of gneiss and granite. In the north it sinks down toward the Oldenwald, which is, however, of different geological structure, being composed for the most part of red sandstone. The whole of Baden, except a small portion in the s.e., in which the Danube takes its rise, belongs to the basin of the Rhine, which bounds it on the south and west. Numerous tributaries of the Rhine intersect it, the chief being the Neckar. Lakes are numerous, and include a considerable part of the Lake of Constance. The climate varies much. The hilly parts, especially in the east, are cold and have a long winter, while the valley of the Rhine enjoys the finest climate of Germany. The principal minerals worked are coal, salt, iron, zinc, and nickel. The number of mineral springs is remarkably great, and of these not a few are of great celebrity. The vegetation is peculiarly rich, and there are magnificent forests. The cereals comprise wheat, oats, barley, and rye. Potatoes, hemp, tobacco, wine, and sugar-beet are largely produced. Several of the wines, both white and red, rank in the first class. Baden has long been famous for its fruits also. Of the total area 42 per cent is under cultivation, 37 per cent under forest, and 17 per cent under meadows and pastures. The farms are mostly quite small. The manufactures are important. Among them are textiles, tobacco, and cigars, chemicals, machinery, pottery ware, jewelry (especially at Pforzheim), wooden clocks, confined chiefly to the districts of the Black Forest, musical boxes and other musical toys. The capital is Karlsruhe, about 5 miles from the Rhine; the other chief towns are Mannheim, Freiburg-im-Breisgau, with a Roman Catholic university; Baden, and Heidelberg. Baden has warm mineral springs, which were known and used in the time of the Romans. Heidelberg has a university (Protestant), founded in 1386, the oldest in the present German Empire. The railways have a length of 850 miles, and are nearly all state property. In the time of the Roman Empire southern Baden belonged to the Roman province of Rhætia. Under the old German Empire it was a margraviate, which in 1533 was divided into Baden-Baden and Baden-Durlach, but reunited in 1771. The title of grand-duke was conferred by Napoleon in 1806, and in the same year Baden was extended to its present limits. The executive power

is vested in the grand-duke, the legislative in the house of legislature, consisting of an upper and a lower chamber.

**BADEN** (or Baden-Baden, to distinguish it from other towns of the same name), a town and watering-place, Grand-duchy of Baden, 18 miles s.s.w. of Karlsruhe, built in the form of an amphitheater on a spur of the Black Forest, overhanging a valley, through which runs a little stream Oosbach. Baden has been celebrated from the remotest antiquity for its thermal baths; and it used also to be celebrated for its gaming saloons. Pop. 15,731.

**BADGER** (baj'ér), a plantigrade, carnivorous mammal, allied both to the bears and to the weasels, of a clumsy make, with short thick legs, and long claws on the fore-feet. The common badger is as large as a middling-sized



Badger

dog, but much lower on the legs, with a flatter and broader body, very thick tough hide, and long coarse hair. It inhabits the north of Europe and Asia, burrows, is indolent and sleepy, feeds by night on vegetables, small quadrupeds, etc. Its flesh may be eaten, and its hair is used for artists' brushes in painting. The American badger belongs to a separate genus.

**BAFFIN BAY**, on the n.e. of North America between Greenland and the islands that lie on the n. of the continent; discovered by Baffin in 1616.

**BAGDAD'**, capital of a Turkish pashalic of the same name (70,000 sq. miles, 1,300,000 inhabitants), in the southern part of Mesopotamia. The greater part of it lies on the eastern bank of the Tigris, which is crossed by a bridge of boats; old Bagdad, the residence of the caliphs (now in ruins), was on the western bank of the river. Manufactures: leather, silks, cottons, woollens, carpets, etc. Steamers ply on the river between Bagdad and Bas-sorah, and the town exports wheat, dates, galls, gum, mohair, carpets, etc., to Europe. Bagdad is inhabited by Turks, Arabs, Persians, Armenians, Jews, etc., and a small number of Europeans. Estimated pop. over 100,000. Bagdad was founded in 762, by the Caliph Almansur, and raised to a high degree of splendor in the 9th century by Harun Al Rashid. It is the scene of a number of the tales of the "Arabian Nights."

**BAGGAGE**, goods carried by a traveler while on the road. In the United States the term is used in a restricted sense to designate certain necessary articles to be used by the person traveling. Railroads as a rule limit the weight of the baggage to be carried



## BAGGAGE

free The carrier is liable for actual baggage, but not for merchandise carried by the passenger. If the carrier, knowing the nature of the merchandise, however, accepts them, he becomes liable for their loss through negligence of his own.



Bagdad, from the south.

**BAGGAGE**, Military, all the goods carried by an army except those which are attached to the persons of the fighting men, such as guns and ammunition. But arms and ammunition carried in bulk are military baggage. All officers are allowed a certain weight of baggage.

**BAGHELKAND**, a tract of country in central India, occupied by a collection of native states (Rewah being the chief), under the governor-general's agent for central India; area, 11,323 sq. miles; pop. 1,737,095.

**BAGIRMI** (bā-gir'mē) or **BAGHERMI**, a Mohammedan negro state in central Africa, situated between Bornu and Waday, to the south of Lake Tchad. It is mostly a plain; has an area of about 56,000 sq. miles, and about 1,500,000 inhabitants.

**BAGPIPE**, a musical wind-instrument of very great antiquity, having been used among the ancient Greeks, and being a favorite instrument over Europe generally in the 15th century. It still continues in use among the country people of Poland, Italy, the south of France, and in Scotland and Ireland. Though now often regarded as the national instrument of Scotland, especially Celtic Scotland, it is only Scottish by adoption, being introduced into that country from England. It consists of a leathern bag, which receives the air from the mouth, or from bellows; and of pipes, into which the air is pressed from the bag by the performer's elbow. In the common or Highland form one pipe (called the chanter) plays the melody; of the three others (called drones) two are in unison with the lowest A of the chanter, and the third and longest an octave lower, the sound being produced by means of reeds.

**BAHA'MA ISLANDS**, or **LUCAYOS**, a group of islands in the West Indies, forming a colony belonging to Britain, lying n.e. of Cuba and s.e. of the coast of Florida, the Gulf-stream passing between them and the mainland. They extend a distance of upward of 600 miles, and are said to be twenty-nine

in number, besides keys and rocks innumerable. The principal islands are Grand Bahama, Great and Little Abaco, Andros Islands, New Providence, Eleuthera, San Salvador, Great Exuma, Watling Island, Long Island, Crooked Island, Acklin Island, Mariguana Island,

Great Inagua. Of the whole group about twenty are inhabited, the most populous being New Providence, which contains the capital, Nassau, the largest being Andros, 100 miles long, 20 to 40 broad. They are low and flat, and have in many parts extensive forests. Total area, 5400 sq. miles. The soil is a thin but rich vegetable mold, and the principal product is pineapples, which form the most important export. The islands are a favorite winter resort for those afflicted with pulmonary diseases. San Salvador, or Cat Island, is generally believed to be the same as Guanahani, the land first touched on by Columbus (October 12, 1492) on his first great voyage of discovery. Pop. 53,735, including 14,000 whites.

**BAHA'WALPUR**, a town of India, capital of state of same name in the Punjab, 2 miles from the Sutlej; surrounded by a mud wall and containing the extensive palace of the Nawab. Pop. 18,700.—The state has an area of



Entrance to Port Nassau, Bahama Islands.

17,285 sq. miles, of which 10,000 is desert, the only cultivated lands lying along the Indus and Sutlej. Pop. 650,042.

## BAILIFF

**BAHIA** (bā-ě'ā), a town of Brazil, on the Bay of All Saints, province of Bahia. It consists of a lower town, which is little more than an irregular, narrow, and dirty street, stretching about 4 miles along the shore; and an upper town, with which it is connected by a steep street, much better built. The harbor is one of the best in South America; and the trade, chiefly in sugar, cotton, coffee, tobacco, hides, piassava, and tapioca, is very extensive. Pop. 162,000—Area of the province (or state), 164,590 sq. miles; pop. 1,821,089.



**BAIKAL** (bī'kāl), a large fresh-water lake in eastern Siberia, 360 miles long, and about 50 in extreme breadth, interspersed with islands; in the line of the great Siberian Railway. It is surrounded by rugged and lofty mountains; contains seals, and many fish, particularly salmon, sturgeon, and pike. Its greatest depth is over 4000 feet. It receives the waters of the Upper Angara, Selenga, Barguzin, etc., and discharges its waters by the Lower Angara. It is frozen over in winter.

**BAIL**, the person or persons who procure the release of a prisoner from custody by becoming surety for his appearance in court at the proper time; also, the security giver for the release of a prisoner from custody.

**BAILIFF**, a civil officer or functionary, subordinate to some one else. There are several kinds of bailiffs, whose offices widely differ, but all agree in this, that



the keeping or protection of something belongs to them.

**BAILLY** (bâ-yē), Jean Sylvain, French astronomer and statesman, born at Paris, 1736. After some youthful essays in verse he was induced by Lacaille to devote himself to astronomy, and on the death of the latter in 1753, being admitted to the Academy of Sciences, he published a reduction of Lacaille's observations on the zodiacal stars. In 1784 the French Academy elected him a member. The revolution drew him into public life. Paris chose him, May 12, 1789, first deputy of the tiers-état, and in the assembly itself he was made first president, a post occupied by him on June 20, 1789, in the session of the Tennis Court, when the deputies swore never to separate till they had given France a new constitution. As mayor of Paris his moderation and impartial enforcement of the law failed to commend themselves to the people, and his forcible suppression of mob violence, July 17, 1791, aroused



Jean Sylvain Bailly.

a storm which led to his resignation and retreat to Nantes. In 1793 he attempted to join Laplace at Melun, but was recognized and sent to Paris, where he was condemned by the revolutionary tribunal, and executed on Nov. 12th.

**BAINBRIDGE**, William, an American naval officer, born in Princeton, N. J., in 1744, died in 1833. He became lieutenant in the navy in 1798, was captured by the French near Guadeloupe, and caused the passage of an act against French subjects captured at sea. He served in the war against Tripoli and captured the Moorish ship Meshboha in 1803, was himself taken by the Tripolitans on having run aground, and held prisoner until the end of the war. He took part in the war of 1812 and captured the British frigate Java. In 1815 he commanded the squadron sent against Algiers and on his return founded the school for naval officers at Boston. His last years were spent in command of the navy yards at Philadelphia and Charlestown.

**BAIRD**, Sir David, a distinguished British commander, was born in Edinburghshire in 1757, and entered the army in 1772. He distinguished himself as a captain in the war against Hyder Ali, was wounded and taken prisoner, and confined in the fortress of Seringapatam for nearly four years. He received a colonelcy in 1795, went

in 1797 to the Cape of Good Hope as brigadier-general, and in 1798, on his appointment as major-general, returned to India. In 1799 he commanded the storming party at the



*Sir David Baird*

assault of Seringapatam. Being appointed in 1800 to command an expedition to Egypt, he landed at Kosseir in June, 1801, crossed the desert, and, embarking on the Nile, descended to Cairo, and thence to Alexandria, which he reached a few days before it surrendered to General Hutchinson. With the rank of lieutenant-general he commanded an expedition in 1805 to the Cape of Good Hope, and in 1806, after defeating the Dutch, he received the surrender of the colony. He commanded a division at the siege of Copen-



Sir David Baird.

hagen, and after a short period of service in Ireland sailed with 10,000 men for Corunna, where he formed a junction with Sir John Moore. He commanded the first division of Moore's army, and in the battle of Corunna lost his left arm. By the death of Sir John Moore Sir David succeeded to the chief command, receiving for the fourth time the thanks of parliament, and a baronetcy. In 1814 he was made a general. He died in 1829.

**BAIRD**, Spencer Fullerton, American naturalist, born 1823, died 1887. He was long assistant secretary, and latterly secretary, of the Smithsonian Institution, and was also chief government commissioner of fish and fisheries. He wrote much on natural history, his chief works being *The Birds of N. America* (in conjunction with John Cassin); *The Mammals of N. America*; *Review of American Birds in the Smithsonian Institution*; and (with Messrs. Brewer and Ridgeway) *History of N. American Birds*.

**BAK'ARGANJ**, a maritime district and town in Bengal; chief rivers, Ganges, Brahmaputra, and Meghna. Area, 3649 sq. miles; pop. 2,153,965.—The town now lies in ruins. Pop. 7060.

**BAKER**, Sir Samuel White, a distinguished English traveler, born in 1821. He resided some years in Ceylon; in 1861 began his African travels, which lasted several years, in the Upper Nile regions, and resulted, among other discoveries, in that of Albert Nyanza lake in 1864, and of the exit of the White Nile from it. In Africa he encountered Speke and Grant after their discovery of the Victoria Nyanza. On his return home he was received with great honor and was knighted. In 1869 he returned to Africa as head of an expedition sent by the Khedive of Egypt to annex and open up to trade a large part of the newly explored country, being raised to the dignity of pasha. He returned in 1873, having finished his work, and was succeeded by the celebrated Gordon. His writings include *The Rifle and the Hound in Ceylon*; *Eight Years' Wanderings in Ceylon*; *The Albert Nyanza, Etc.*; *The Nile Tributaries of Abyssinia*; *Ismailia: a Narrative of the Expedition to Central Africa*; *Cyprus as I Saw It in 1879*; also, *Cast Up by the Sea*, a story published in 1869. He died Dec. 30, 1893.

**BAKHUISEN**. See Backhuysen.

**BAKING**, a term used in various senses. For the baking of bread, see Bread. A common application of the term is to a mode of cooking food in a close oven, baking in this case being opposed to roasting or broiling, in which an open fire is used. The oven should not be too close, but ought to be properly ventilated. Baking is also applied to the hardening of earthenware or porcelain by fire.

**BAKING POWDER**, a mixture of bicarbonate of soda and tartaric acid, usually with some flour added. The water of the dough causes the liberation of carbonic acid, which makes the bread "rise."

**BAKU** (bâ-kö'), a Russian port on the western shore of the Caspian, occupying part of the peninsula of Apsheron. The naphtha or petroleum springs of Baku have long been known; and the Field of Fire, so called from emitting inflammable gases, has long been a place of pilgrimage with the Guebres or Fire-worshippers. Recently, from the development of the petroleum industry, Baku has greatly increased, and is now a large and flourishing town. About 400 oil-wells are in operation, producing immense quantities of petroleum, much of which is led direct in pipes from the



wells to the refineries in Baku, and it is intended to lay a pipe for its conveyance all the way to the Black Sea at Batoum, which is already connected with Baku by railway. Some of the wells have had such an outflow of oil as to be unmanageable, and the Baku petroleum now competes successfully with any other in the markets of the world. Baku is the station of the Caspian fleet, is strongly fortified, and has a large shipping trade. Pop. 112,253.

**BAKU'NIN**, Michael, Russian socialist, the founder of Nihilism, born 1814 of rich and noble family, entered the army, but threw up his commission after two years' service, and studied philosophy at Moscow. Having adopted Hegel's system as the basis of a new revolution, he went in 1841 to Berlin, and thence to Dresden, Geneva, and Paris, as the propagandist of anarchism. His extreme views, however, led to a quarrel with Marx and the International; and, having fallen into disrepute with his own party in Russia, he died suddenly and almost alone at Berne, in 1878.

**BALAAM** (bā'lam), a heathen seer, invited by Balak, king of Moab, to curse the Israelites, but compelled by miracle to bless them instead (Numbers xxii.-xxiv.). In another account he is represented as aiding in the perversion of the Israelites to the worship of Baal, and as being, therefore, slain in the Midianitish war (Numbers xxxi.; Joshua xiii.).

**BALAKLAVA** (bā-lā-klā'vā), a small seaport in the Crimea, 8 miles s.s.e. of Sevastopol, consisting for the most part of houses perched upon heights, with

**BALANCE**, an instrument employed for determining the quantity of any substance equal to a given weight.

**BALANCE OF POWER**, a political principle which first came to be recognized in modern Europe in the 16th century, though it appears to have been also acted on by the Greeks in ancient times, in preserving the relations between their different states. The object in maintaining the balance of power is to secure the general independence of nations as a whole, by preventing the aggressive attempts of individual states to extend their territory and sway at the expense of weaker countries.

**BALANCE OF TRADE**, the difference between the stated money values of the exports and imports of a country. The balance is erroneously said to be "in favor" of a country when the value of the exports is in excess of that of the imports and "against it" when the imports are in excess of the exports. The phrases date from the days of the mercantile system, the characteristic doctrine of which alleged the desirability of regulating commerce with a view to amassing treasure by exporting produce largely, importing little merchandise in return, and receiving the balance in bullion.

**BALBO'A**, Vasco Nuñez de, one of the early Spanish adventurers in the New World; born 1475. Having dissipated his fortune, he went to America, and was at Darien with the expedition of Francisco de Enciso in 1510. An insurrection placed him at the head of the colony, but rumors of a western ocean and of the wealth of Peru led him to cross the isthmus. On Sept. 25, 1513, he saw for the first time the Pacific, and

him, and gave him his daughter in marriage, but shortly after, in 1517, had him beheaded on a charge of intent to rebel. Pizarro, who afterward completed the discovery of Peru, served under Balboa.

**BAL'CONY**, in architecture, is a gallery projecting from the outer wall of a building, supported by columns or brackets, and surrounded by a balustrade. Balconies were not used in Greek and Roman buildings, and in the East the roof of the house has for centuries served similar purposes on a larger scale. Balconies properly so styled came into fashion in Italy in the middle ages, and were apparently introduced into Britain in the 16th century.

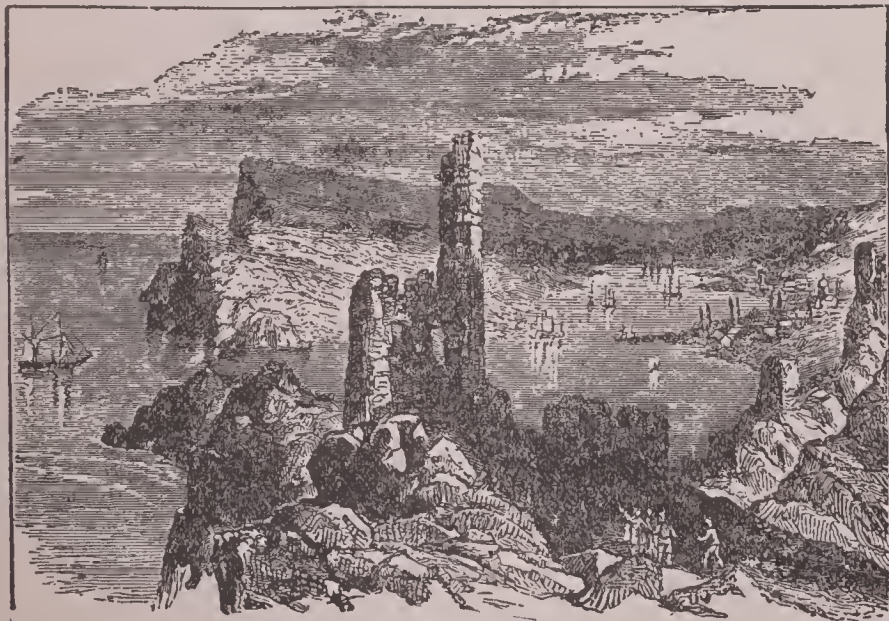
**BALDNESS**, loss of the hair, complete or partial, usually the latter, and due to various causes. Most commonly it results as one of the changes belonging to old age, due to wasting of the skin, hair sacs, etc. It may occur as a result of some acute disease, or at an unusually early age, without any such cause. In both the latter cases it is due to defective nourishment of the hair, owing to lessened circulation of the blood in the scalp. The best treatment for preventing loss of hair seems to consist in such measures as bathing the head with cold water and drying it by vigorous rubbing with a rough towel and brushing it well with a hard brush. Various stimulating lotions are also recommended, especially those containing cantharides. But probably in most cases senile baldness is unpreventable. When extreme scurfiness of the scalp accompanies loss of the hair an ointment that will clear away the scurf will prove beneficial.

**BALDWIN**, Evelyn Briggs, an American arctic explorer, born in Missouri in 1862, was a teacher until 1892, when he was appointed observer of the U. States Weather Bureau. In 1893-4 he accompanied Peary to North Greenland as meteorologist, and also went in the same capacity with Wellman in 1898-9.

**BALE** (bāl). See Basel.

**BALEAR'IC ISLANDS**, a group of five islands southeast of Spain, including Majorca, Minorca, Iviza, and Formentera. The popular derivation of the ancient name *Baleares* has reference to the repute of the inhabitants for their skill in slinging, in which they distinguished themselves both in the army of Hannibal and under the Romans, by whom the islands were annexed in 123 B.C. After being taken by the Vandals, under Genseric, and in the 8th century by the Moors, they were taken by James I., King of Arragon, 1220-34, and constituted a kingdom, which in 1375 was united to Spain. The islands now form a Spanish province, with an area of 1860 square miles, and 300,473 inhabitants. See separate articles.

**BALFE** (balf), Michael William, composer, was born in Dublin 15th May, 1808. In his seventh year he performed in public on the violin, and at sixteen took the part of the Wicked Huntsman in *Der Freischütz* at Drury Lane. In 1825 he went to Italy, wrote the music for a ballet *La Peyrouse* for the Scala at Milan, and in the following year sang at the Théâtre-Italien, Paris, with



Balaklava harbor.

an old Genoese castle on an almost inaccessible elevation. The harbor has a very narrow entrance, and though deep, is not capacious. In the Crimean war it was captured by the British, and a heroically fought battle took place here (Oct. 25, 1854), ending in the repulse of the Russians by the British. The "charge of the Light Brigade" was at this battle.

after annexing it to Spain, and acquiring information about Peru, returned to Darien. Here he found himself supplanted by a new governor, Pedrarias Davila, with much consequent grievance on the one side, and much jealousy on the other. Balboa submitted, however, and in the following year was appointed viceroy of the South Sea. Davila was apparently reconciled to











modern success. He returned to Italy, and at Palermo was given his first opera, *I Rivali* (1829). For five years he continued singing and composing operas for the Italian stage. In 1835 he went to England, and composed a number of operas, among others *The Bohemian Girl* (1843), *Rose of Castile* (1857), *Satanella* (1858), and the *Talisman* (first performed in 1874). He died Oct. 20, 1870. His operas are melodious and many of the airs are excellent.

**BAL'FOUR**, Right Hon. Arthur James, LL.D., F.R.S., etc., son of Mr. Balfour of Whittinghame, Haddingtonshire, was born July 15, 1848, and educated at Eton and Trinity College, Cambridge. He acted as private secretary to his uncle, the Marquis of Salisbury, at the Foreign Office during 1878-80, and since 1885 has been a distinguished member of the Conservative party. He showed much ability as Chief Secretary for Ireland during Lord Salisbury's administration in 1887-91. He was leader of the House of Commons and first lord of the treasury in 1891-92, and again from 1895. On the retirement of Lord Salisbury in 1902 he became prime minister. He has published a *Defence of Philosophic Doubt* (1879), *Essays and Addresses* (1893), and *The Foundations of Belief* (1895).

**BALFROOSH'**, or **BARFURUSH'**, a town, Persia, province of Mazanderan, about twelve miles from the Caspian, a great emporium of the trade between Persia and Russia. Pop. estimated from 50,000 to 100,000.

**BALI'**, an island of the Indian Archipelago east of Java, belonging to Holland; greatest length, 85, greatest breadth, 55 miles; area, about 2260 sq. miles. It consists chiefly of a series of volcanic mountains, of which the loftiest, Agoong (11,326 feet), became active in 1843 after a long period of quiescence. Principal products, rice, cocoa, coffee, indigo, cotton, etc. The people are akin to those of Java and are mostly Brahmans in religion. It is divided into eight provinces under native rajahs, and forms one colony with Lombok, the united pop. being 1,363,000, of whom about 500,000 belong to Bali.

**BAL'IOL**, or **BALLIOL**, John de, of Barnard Castle, Northumberland, father of king John Baliol, a great English baron in the reign of Henry III. In 1263 he laid the foundation of Balliol College, Oxford, which was completed by his widow Devorguila or Devorgilla. She was daughter and co-heiress of Allan of Galloway, a great baron of Scotland, by Margaret, eldest daughter of David, Earl of Huntingdon, brother of William the Lion. It was on the strength of this genealogy that his son John Baliol became temporary King of Scotland. He died 1269.

**BAL'IOL**, or **BALLIOL**, John, King of Scotland; born about 1249, died 1315. On the death of Margaret, the Maiden of Norway and grandchild of Alexander III, Balliol claimed the vacant throne by virtue of his descent from David, Earl of Huntingdon, brother of William the Lion, King of Scotland. Robert Bruce (grandfather of the king) opposed Baliol; but Edward I.'s decision was in favor of Baliol, who did homage to him for the

kingdom, Nov. 20, 1292. Irritated by Edward's harsh exercise of authority, Baliol concluded a treaty with France, then at war with England; but after the defeat at Dunbar he surrendered his crown into the hands of the English monarch. He was sent with his son to the Tower, but by the intercession of the pope in 1297, obtained liberty to retire to his Norman estates, where he died.—His son, Edward, in 1332 landed in Fife with an armed force, and having defeated a large army under the regent Mar (who was killed) got himself crowned king, but was driven out in three months.

**BAL'KAN**, a rugged chain of mountains extending from Cape Emineh, on the Black Sea, in Eastern Roumelia, westward to the borders of Servia, though the name is sometimes used to include the whole mountain system from the Black Sea to the Adriatic, the region south of Austria and Russia, or south of the Danube and Save, forming the Balkan Peninsula. The range, which is over 200 miles in length, forms the water-shed between the streams flowing northward into the Danube and those flowing southward to the Aegean, the chief of the latter being the Maritza. The average height is not more than 5000 feet, but the highest point, Tchataldagh, is 8340 feet. As a political boundary it divides Bulgaria from Eastern Roumelia.

**BALKAN FREE STATES**, Bulgaria, Eastern Roumelia, Rumania, and Servia.

**BALKH** (balk or bälh), a city in the north of Afghanistan, in Afghan Turkestan, at one time the emporium of the trade between India, China, and western Asia. It was long the center of Zoroastrianism, and was also an important Buddhist center. In 1220 it was sacked by Genghis Khan, and again by Timur in the 14th century. The remains of the ancient city extend for miles. The town is now merely a village, but a new town has risen up an hour's journey north of the old, the residence of the Afghan governor, with a pop. of about 20,000.—The district, which formed a portion of ancient Bactria, lies between the Oxus and the Hindu-Kush, with Badakshan to the east and the desert to the west. In the vicinity of the Oxus, where there are facilities for irrigation, the soil is rich and productive, and there are many populous villages.

**BAL'KIS**, the Arabian name of the Queen of Sheba who visited Solomon. She is the central figure of innumerable Eastern legends and tales.

**BALL**, a spherical implement originally of war, later of sports and games which are the degenerated forms of war. The ball was freely used by the Romans and Greeks, and playing with a ball dates farther back than history. Tennis, racquet, football, baseball, golf, in short all games using a ball, have an origin so old as to be lost in antiquity. The term ball is often used to designate projectiles from firearms generally.

**BALL**, Thomas, an American sculptor, born in 1819 at Charlestown, Mass. He made busts of Jenny Lind, of Daniel Webster (1852), and a life-sized figure of the latter. He is the sculptor of the Washington statue at Boston, of the

statue of Webster in Central Park, N. Y., and of the group "Emancipation" at Washington.

**BAL'LAD**, a term loosely applied to various poetic forms of the song type, but in its most definite sense a poem in which a short narrative is subjected to simple lyrical treatment. The ballad is probably one of the earliest forms of rhythmic poetic expression, constituting a species of epic in miniature, out of which by fusion and remolding larger epics were sometimes shaped. As in the folk-tales, so in the ballads of different nations, the resemblances are sufficiently numerous and close to point to the conclusion that they have often had their first origin in the same primitive folklore or popular tales. But in any case, excepting a few modern literary ballads of a subtler kind, they have been the popular expression of the broad human emotions clustering about some strongly outlined incidents of war, love, crime, superstition, or death.

**BALLADE** (bal-äd'), the earlier and modern French spelling of ballad, but now limited in its use to a distinct verse-form introduced into English literature of late years from the French and chiefly used by writers of vers-de-société. It consists of three stanzas of eight lines each, with an envoy or closing stanza of four lines. The rhymes, which are not more than three, follow each other in the stanzas thus: a, b, a, b; b, c, b, c, and in the envoy, b, c, b, c, and the same line serves as a refrain to each of the stanzas and to the envoy. There are other varieties, but this may be regarded as the strictest, according to the precedent of Villon and Marot.

**BALLARAT'**, or **BALLAARAT**, an Australian town in Victoria, chief center of the gold-mining industry of the colony, and next in importance to Melbourne, from which it is distant w.n.w. about sixty miles direct. Gold was first discovered in 1851, and the extraordinary richness of the field soon attracted hosts of miners. The surface diggings having been exhausted the precious metal is now got from greater depths, and there are mines as deep as some coal-pits, the gold being obtained by crushing the auriferous quartz. Pop. about 43,000.

**BAL'LAST**, a term applied (1) to heavy matter, as stone, sand, iron, or water placed in the bottom of a ship or other vessel to sink it in the water to such a depth as to enable it to carry sufficient sail without oversetting. (2) The sand placed in bags in the car of a balloon to steady it and to enable the aeronaut to lighten the balloon by throwing part of it out. (3) The material used to fill up the space between the rails on a railway in order to make it firm and solid.

**BALL-COCK**, a kind of self-acting stop-cock opened and shut by means of a hollow sphere or ball of metal attached to the end of a lever connected with the cock. Such cocks are often employed to regulate the supply of water to cisterns. The ball floats on the water in the cistern by its buoyancy, and rises and sinks as the water rises and sinks, shutting off the water in the one case and letting it on in the other.



**BALLET** (bal'ā), a species of dance usually forming an interlude in theatrical performances, but principally confined to opera. Its object is to represent, by mimic movements and dances, actions, characters, sentiments, passions, and feelings, in which several dancers perform together. The ballet is an invention of modern times, though pantomimic dances were not unknown to the ancients. The dances frequently introduced into operas seldom deserve the name ballet, as they usually do not represent any action, but are destined only to give the dancers an opportunity of showing their skill, and the modern ballet in general, from an artistic point of view, is a very low-class entertainment.

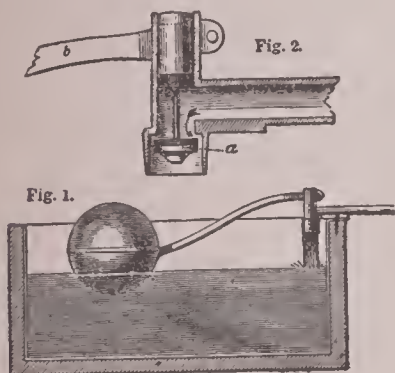


Fig. 1. Cistern with ball-cock attached.  
Fig. 2. Internal structure of cock.

a, Valve shown open so as to admit water.  
b, Arm of lever, which being raised shuts the valve.

**BALLIS'TIC PENDULUM**, an apparatus for ascertaining the velocity of military projectiles, and consequently the force of fired gunpowder. A piece of ordnance is fired against bags of sand supported in a strong case or frame suspended so as to swing like a pendulum. The arc through which it vibrates is shown by an index, and the amount of vibration forms a measure of the force or velocity of the ball.

**BALLOON**. See Airship.

**BALLOT**, Voting by, signifies literally voting by means of little balls (called by the French *ballottes*), usually of different colors, which are put into a box in such a manner as to enable the voter, if he chooses, to conceal for whom or for what he gives his suffrage. The method is adopted by most clubs in the election of their members—a white ball indicating assent, a black ball dissent. Hence, when an applicant is rejected, he is said to be blackballed. The term voting by ballot is also applied in a general way to any method of secret voting, as, for instance, when a person gives his vote by means of a ticket bearing the name of the candidate whom he wishes to support. In this sense vote by ballot is the mode adopted in electing the members of legislative assemblies in most countries, as well as the members of various other bodies.

**BALM** (bām), a plant formerly in great repute for its medicinal virtues. A native of the south of Europe. It is a herbaceous perennial, with an erect branching stem about 2 feet high. The leaves arise with the flower-stems from a

thick joint at the extremity of the stalk. The flowers are whitish; they are produced in a round terminal umbel, and appear in June. The stems and leaves are slightly stimulating and tonic. They contain an essential oil of a yellowish color and with a fragrant smell, called oil of balm.

**BALM OF GILEAD**, the exudation of a tree, a native of Arabia Felix. The leaves of the former tree yield when bruised a strong aromatic scent; and the



Balm of Gilead.

balm of Gilead of the shops, or balsam of Meccā or of Syria, is obtained from it by making an incision in its trunk. It has a yellowish or greenish color, a warm, bitterish, aromatic taste, and an acidulous fragrant smell. It is valued as an odoriferous unguent and cosmetic by the Turks. It is frequently adulterated for market.—The balm of Gilead fir, which produces a turpentine called Canada balsam, is the *Abies balsamifera*, a North American species, whose range is from Virginia to Canada.

**BALSAM**, an aromatic, resinous substance, flowing spontaneously or by incision from certain plants. A great variety of substances pass under this name. But in chemistry the term is confined to such vegetable juices as consist of resins mixed with volatile oils, and yield the volatile oil on distillation. The resins are produced from the oils by oxidation. A balsam is thus intermediate between a volatile oil and a resin. It is soluble in alcohol and ether, and capable of yielding benzoic acid. The balsams are either liquid or more or less solid; as, for example, the balm of Gilead, and the balsams of copaiba, Peru, and Tolu. Benzoin, dragon's blood, and storax are not true balsams, though sometimes called so. The balsams are used in perfumery, medicine, and the arts.

**BALTIC PROVINCES**, a term commonly given to the Russian governments of Courland, Livonia, and Esthonia.

**BALTIC SEA**, an inland sea or large gulf connected with the North Sea, washing the coasts of Denmark, Germany, Russia, and Sweden; nearly 900 miles long, extending to 200 broad; superficial extent, together with the Gulfs of Bothnia and Finland, 171,743 sq. miles. Its greatest depth is 126 fathoms; mean, 44 fathoms.

**BALTIMORE**, the sixth most populous city of the United States, the chief city of Maryland. It has an area of

31.5 sq. miles, and is situated on the Patapsco river, at the head of navigation 14 miles from Chesapeake Bay. The city is divided into two parts by a small stream called Jones' Falls, which separates the business and manufacturing from the residence portion of the town. The names of Monumental City, or City of Monuments, which Baltimore bears, is not derived from the number of its public monuments, but from the early date at which Washington Monument, in Mount Vernon Place—a marble shaft rising 164 feet, surmounted by a heroic figure of Washington—and Battle Monument, in Monument Square, were erected.

The city is one of the foremost educational influences of the country. A graded system of public schools provides free instruction in kindergarten, primary, secondary, collegiate, and normal studies, and in manual training.

Baltimore is the seat of the Johns Hopkins University, opened for instruction in 1876, and distinguished for its graduate courses. The institution owes its foundation to the beneficence of a Baltimore merchant, who left a large fortune for the endowment of a university and a hospital. Among the professional schools are the law



and medical departments of the University of Maryland, College of Physicians and Surgeons, Baltimore Medical College, Baltimore University, Woman's Medical College, Maryland College of Pharmacy, and Baltimore College of Dental Surgery. The last named, founded in 1839, is the oldest dental college in the world. The Peabody institute, endowed by George Pea-



body, who laid the foundation of his great fortune in Baltimore and entertained a strong friendship for its people, contains a valuable library of 143,000 volumes, an interesting art gallery, and a well-organized conservatory of music.

Natural situation, favorable trade connections, and unusual harbor facilities constitute Baltimore's chief commercial advantages. Regular communication between Baltimore and foreign ports is afforded by the North German Lloyd to Bremen, the Neptune Line to Rotterdam, the Atlantic Transport Line to London, and a number of other lines offering frequent service. The city is the largest corn exporting port in the United States. Other important articles of local export are wheat, flour, cotton, tobacco, copper, and coal. Importing activity centers about iron ore, bananas, pineapples, cocoanuts, sugar, and general merchandise.

The manufacturing enterprises of Baltimore are most varied, scarcely a single important industry being unrepresented. It is the largest manufacturing center in the United States for ready-made clothing, shirts, fertilizers, straw goods, cotton duck, fruit canning, and oyster packing, while in other important fields its operations are of absolutely greater magnitude.

The twelfth census (1900) of the United States gives the total population of Baltimore as 508,957; 243,280 are males and 265,677 are females; 440,357 are native born and 68,600 are foreign born. The total number of whites is 429,218, and of colored 79,739. Of the whites 361,278 are native born, 67,940 are foreign; 236,053 of the native whites have native parents and 125,225 have foreign parents. The total illiterate population ten years and over is 29,148, of whom 12,111 are white and 17,037 are colored. Estimated by the mayor of the city Jan. 1, 1909, 650,000.

Baltimore was founded July 14, 1729, and passed through the vicissitudes of the revolutionary war, that of 1812, and likewise of the civil war. It has several times been a sufferer from destructive fires, but has always recovered without assistance from outside sources.

**BALTIMORE**, GEORGE CALVERT, Lord, born in Yorkshire about 1580; died in London, 1632. He was for some time secretary of state to James I., but this post he resigned in 1624 in consequence of having become a Roman Catholic. Notwithstanding this he retained the confidence of the king, who in 1625 raised him to the Irish peerage, his title being from Baltimore, a fishing village of Cork. He had previously obtained a grant of land in Newfoundland, but as this colony was much exposed to the attacks of the French, he left it and obtained another patent for Maryland. He died before the charter was completed, and it was granted to his son Cecil, who deputed the governorship to his brother Leonard (1606-47).

**BALTIMORE BIRD**, an American bird. It is a migratory bird, and is known also by the names of "golden robin," "hang-bird," and "fire-bird." It is about 7 inches long; the head and

upper parts are black; the under parts of a brilliant orange hue. It builds a pouch-like nest, very skilfully constructed of threads deftly interwoven, suspended from a forked branch and shaded by overhanging leaves. It feeds on insects, caterpillars, beetles, etc. Its song is a clear, mellow whistle.

**BALUCHISTAN** (ba-lō'chi-stān), a country in Asia, the coast of which is continuous with the northwestern seaboard of India, bounded on the north by Afghanistan, on the west by Persia,



Baluchis on the lookout.

on the south by the Arabian Sea, and on the east by Sind. It has an area of about 160,000 sq. miles, and a population estimated at 400,000. The general surface of the country is rugged and mountainous, with some extensive intervals of barren sandy deserts, and there is a general deficiency of water. The country is almost entirely occupied by pastoral tribes under semi-independent sirdars or chiefs. The Baluchis in general have tall figures, long visages, and prominent features; the Brahuis, on the contrary, have short, thick bodies, with round faces and flat lineaments, with hair and beards frequently brown. Both races are zealous Mohammedans, hospitable, brave, and capable of enduring much fatigue.

**BAL'USTER**, a small column or pilaster, of various forms and dimensions, often adorned with mouldings, used for balustrades.

**BALUSTRADE**, a range of balusters, together with the cornice or coping which they support, used as a parapet for bridges or the roofs of buildings, or as a mere termination to a structure; also serving as a fence or enclosure for altars, balconies, terraces, staircases, etc.

**BALUZE**, (bà-lüz), ETIENNE, French historian and miscellaneous writer, born 1630, died 1718. For more than 30 years he was librarian to M. de Colbert, and was appointed professor of canon law in the royal college, but displeasing Louis XIV. with his *Histoire*

generale de la maison d'Auvergne, he was thrown into prison and his property confiscated. He recovered his liberty in 1713, but did not regain his position. He left some 1500 MSS. in the national library of Paris, besides 45 printed works, including *Regum Francorum Capitularia*, two vols. and *Miscellanea*, seven volumes.

**BALZAC** (bâl-zâk), Honoré de, a celebrated French novelist, was born at Tours in 1799, died 1850. Before completing his twenty-fourth year he had published a number of novels under various assumed names, but the success attending all was very indifferent; and it was not till 1829, by the publication of *Le Dernier Chouan*, a tale of La Vendée, and the first novel to which Balzac appended his name, that the attention of the public was diverted to the extraordinary genius of the author. A still greater popularity attended his *Physiologie de Mariage*, a work full of piquant and caustic observations on human nature. He wrote a large number of novels, all marked by a singular knowledge of human nature and distinct delineation of character, but apt to be marred by exaggeration. Among his best-known works are *Scènes de la Vie de Province*; *Scènes de la Vie Parisienne*; *Le Père Goriot*; *Eugénie Grandet*; and *Le Médecin de Campagne*. The publication of this last, in 1835, led to a correspondence between Balzac and the Countess Eveline de Hanska, a Polish lady whom, after about fifteen years, he visited and married. A collected edition of his works under the title *La Comédie Humaine* was published in 45 vols., Paris, 1856-59.

**BAMBA**, a district of the Congo, west coast of Africa, lying to the south of the River Ambriz. It is thickly populated, and is rich in gold, silver, copper, salt, etc.

**BAMBAR'RA**, a territory of western Africa, on the Upper Niger, first visited by Mungo Park, now in the French portion of the Soudan. The country is generally very fertile, producing wheat, rice, maize, yams, etc. The inhabitants are of negro or mixed race, and partly Mohammedans. Excellent cotton cloth is made. The chief town is Sego. Pop. estimated at 2,000,000.

**BAMBINO**, (bâm-bê-nô; Ital., an infant), the figure of our Savior represented as an infant in swaddling clothes. The Santissimo Bambino in the church of Ara Cœli at Rome, a richly decorated figure carved in wood, is believed to have a miraculous virtue in curing diseases. Bambinos are set up for the adoration of the faithful in many places in Catholic countries.

**BAMBOO**, the common name of arborescent grasses. There are many species, belonging to the warmer parts of Asia, Africa, and America, and growing from a few feet to as much as 100, requiring much moisture to thrive properly. The best-known species is common in tropical and sub-tropical regions. From the creeping underground rhizome, which is long, thick, and jointed, spring several round jointed stalks, which send out from their joints several shoots, the stalks also being armed at their joints with one or



two sharp rigid spines. The oval leaves 8 or 9 inches long, are placed on short footstalks. The flowers grow in large panicles from the joints of the stalk. Some stems grow to 8 or 10 inches in diameter, and are so hard and durable



1, Bamboo, showing the mode of growth.  
2, Flowers, leaves, and stem on a larger scale.

as to be used for building purposes. The smaller stalks are used for walking-sticks, flutes, etc.; and indeed the plant is used for innumerable purposes in the East Indies, China, and other Eastern countries. Cottages are almost wholly made of it; also, bridges, boxes, water-pipes, ladders, fences, bows and arrows, spears, baskets, mats, paper, masts for boats, etc.

**BANA'NA**, a plant of the genus *Musa*. It is originally indigenous to the East Indies, and a herbaceous plant with an underground stem. The apparent stem, which is sometimes as high as 30 feet, is formed of the closely compacted sheaths of the leaves. The leaves are 6 to 10 feet long and 1 or more broad, with a strong midrib, from which the veins are given off at right angles; they are used for thatch, basket-making, etc., besides yielding a useful fiber. The spikes of the flowers grow nearly 4 feet long, in bunches, covered with purple-colored bracts. The fruit is 4 to 10 or 12 inches long, and 1 inch or more in diameter; it grows in large bunches, weighing often from 40 to 80 lbs. The pulp is soft and of a luscious taste; when ripe it is eaten raw or fried in slices. The banana is cultivated in tropical and sub-tropical countries, and is an important article of food. Manila hemp is the product of a species of banana.

**BAN'CROFT**, George, American historian, born near Worcester, Mass., 1800, died 1891. He was educated at Harvard and in Germany, where he made the acquaintance of many literary men of note. In 1823 he published a translation of Heeren's *Politics of Ancient Greece*, and a small volume of poems, and was also meditating and collecting materials for a history of the United States. Between 1834 and 1840 three volumes of his history were published. In 1845 he was appointed secretary of the navy, and effected many reforms and improvements in that

department. He was American ambassador to Britain from 1846 to 1849, when the University of Oxford conferred on him the honorary degree of D.C.L. He took the opportunity while in Europe to perfect his collections on American history. He returned to New York in 1849, and began to prepare for the press the fourth and fifth volumes of his history, which appeared in 1852. The sixth appeared in 1854, the seventh in 1858, the eight soon after, but the ninth did not appear till 1866. From 1867 to 1874 he was minister plenipotentiary at the court of Berlin. The tenth and last volume of his great work appeared in 1874. An additional section appeared first as a separate work in 1882—*History of the Formation of the Constitution of the U. States*—and the whole came out in 6 vols. in 1884-5. He has also published many essays in the *North American Review* and other periodicals, a selection from which was published in 1855 under the title of *Miscellanies*.

**BANCROFT**, Hubert Howe, an American historian, born in Ohio in 1832. He embarked in business on the Pacific coast, became interested in its history, and decided to devote his life to that work. He made numerous expeditions, spending large sums of money in the work of investigation, and has published several volumes of the history of the Western States. He has also published histories of Mexico, Central America, British Columbia, and other western and southern parts of America.

**BAND**, a number of musicians organized for the production of marching or concert music. Mere drum and fife can hardly be dignified by the name band, which is usually confined to an organization consisting of brass and reed instruments, drums, etc. The military band is the highest form of band, and takes its origin from the time of Louis XIV. All the courts of Europe had their bands, but the modern military or marine (naval) band is a recent development, and verges closely on the orchestra. Its principal instruments are tubas, cornets, clarionets, trombones, saxophones, oboes, bass horns, snare, bass, and kettle drums, and tympani. The number of instruments is unlimited.

**BANDA**, a town and district of India, in the United Provinces. The town stands on a plain on the right bank of the Ken river, 95 miles s.w. from Allahabad, and is a considerable cotton-mart. Pop. 22,565.—Area of district 3060 sq. miles; pop. 705,832.

**BANDAGE**, a surgical wrapper of some kind applied to a limb or other portion of the body to keep parts in position, exert a pressure, or for other purpose. To be able to apply a bandage suitably in the case of an accident is a highly useful accomplishment, which, through the teaching of ambulance surgery now so common, may be easily acquired.

**BANDA ISLANDS**, a group belonging to Holland, Indian Archipelago, south of Ceram; Great Banda, the largest, being 12 miles long by 2 broad. They are beautiful islands, of volcanic origin, yielding quantities of nutmeg. Goenong Api, or Fire Mountain, is a cone-shaped

volcano which rises 2320 feet above the sea. Pop. 6700.

**BAN'DICOOT**, the largest known species of rat, attaining the weight of 2 or 3 lbs., and the length, including the tail, of 24 to 30 inches. It is a native of India, and is very abundant in Ceylon. Its flesh is said to be delicate and to resemble young pork, and is a favorite article of diet with the coolies. It is destructive to rice fields and gardens.—The name is also given to a family of Australian marsupials. The most common species, the long-nosed bandicoot, measures about 1½ feet from the tip of the snout to the origin of the tail, and in general appearance bears a considerable resemblance to a large overgrown rat.

**BAN'DIT**, originally an exile, banished man, or outlaw, and hence, as persons outlawed frequently adopted the profession of brigand or highwayman, the word came to be synonymous with brigand, and is now applied to members of the organized gangs which infest some districts of Italy, Sicily, Spain, Greece, and Turkey.

**BAND OF HOPE**, a name given to societies of young persons pledged to teetotalism.

**BANFF** (bamf), county town of Banffshire, Scotland, a seaport on the Moray Firth at the mouth of the Deveron. Pop. of parl. burgh, which includes Macduff, 7148; Banff portion, 3730.—The county has an area of 410,112 acres. In the south it is mountainous, but the northern part is comparatively low and fertile; principal rivers, the Spey and Deveron; principal mountains, Cairngorm (4095 feet) and Ben Macdhui (4296 feet), on its southern boundary. Little wheat is raised, the principal crops being barley, oats, turnips, and potatoes. Fishing is an important industry; as is also the distilling of whisky. Serpentine abounds in several places, especially at Portsoy, where it is known as "Portsoy marble," and Scotch topazes or cairngorm stones are found on the mountains in the south. Pop. 61,487.

**BANGALORE**, a town of Hindustan, capital of Mysore, and giving its name to a considerable district in the east of Mysore state. There are manufactures of silks, cotton cloth, carpets, gold and silver lace, etc. Pop. 159,046.—The Bangalore district has an area of 2559 square miles, of which more than half represent cultivable land. Pop. 802,994.

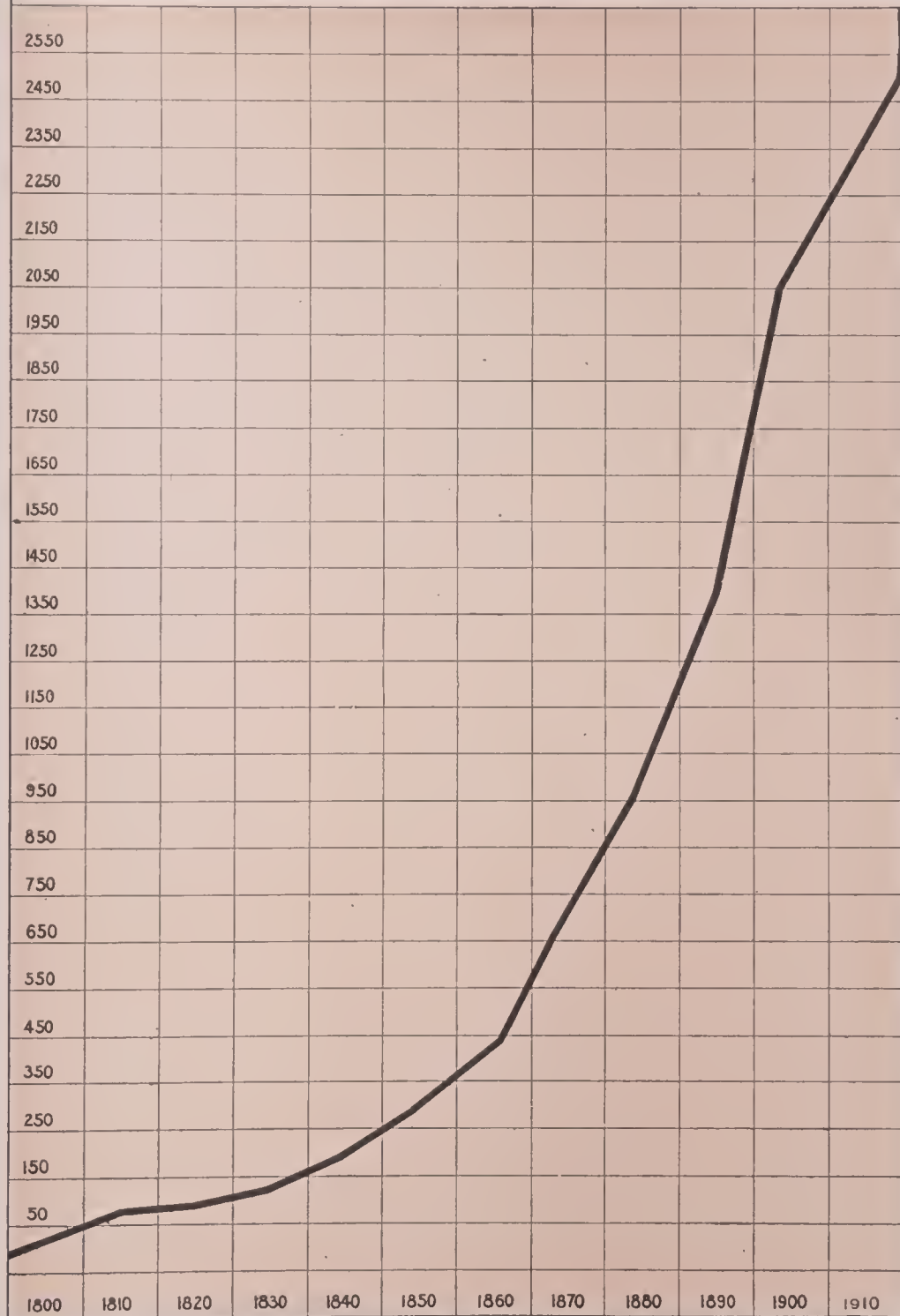
**BANGKOK**, the capital of the Kingdom of Siam, extending for several miles on both sides of the Menam, which falls into the Gulf of Siam about 15 miles below. The trade, both inland and foreign, is very extensive, the exports consisting chiefly of rice, sugar, silk, cotton, tobacco, pepper, sesame, ivory, aromatic wood, cabinet woods, tin, hides, etc.; and the imports consisting chiefly of cotton, woolen, and other goods. Pop. estimated at 500,000, of whom about a half are Chinese.

**BAN'GOR**, a port of the United States, in Maine, on the west side of Penobscot river, a flourishing and pleasantly situated town, and one of the largest lumber depots in the world. The river is navigable to the town for vessels of the largest size. Pop. 22,000



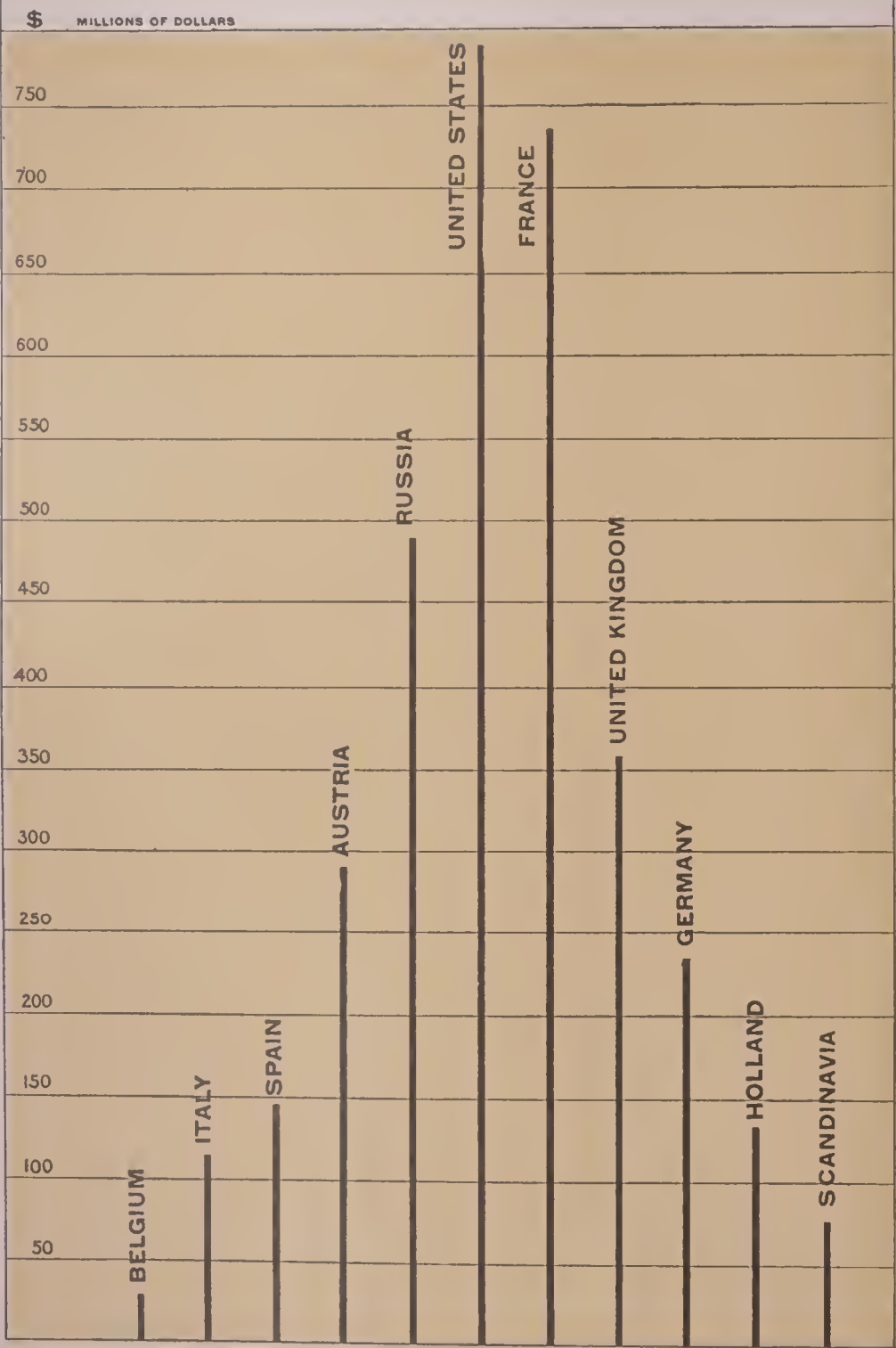
# MONEY IN THE UNITED STATES BY DECADES FROM 1800-1908

MILLIONS





CAPITAL OF BANKS:





**BANGS**, John Kendrick, an American humorist and verse writer, born in New York in 1862. He has been editor of Harper's Weekly, and has published several volumes of humor and verse, among them *The Idiot*, and *Coffee and Repartee*.

**BAN'JO**, the favorite musical instrument of the negroes of the Southern States of America. It is six-stringed, has a body like a tambourine and a neck like a guitar, and is played by stopping the strings with the fingers of the left hand and twitching or striking them with the fingers of the right. The upper or octave string, however, is never stopped.

**BANK**, primarily an establishment for the deposit, custody, and repayment on demand, of money, and obtaining the bulk of its profits from the investment of sums thus derived and not in immediate demand. Banks are among the oldest institutions in the world. There is evidence of their existence in Assyria thousands of years before the Christian era, and banks were used in ancient Athens and Rome. Modern banking begins in 1587 with the famous bank of Venice, which had itself been preceded by private banks in the great Venetian republic. Other medieval banks were the Bank of Amsterdam and the Bank of Hamburg. It was not until the 18th century that the distinctly modern features of banking arose—the issue of notes not covered by coin and the granting of accounts on the mere credit of borrowers. Bank notes were known in China 1200 years ago, but the first European bank notes were those issued by the Bank of Sweden in 1661. In the 17th century the Bank of England arose and the bank note became substantially what it is today.

Modern banks have three functions, deposits, discounts and issue. Primarily the bank was a safe place for the keeping of money, but its present function is the collection of small sums of capital which might otherwise be idle, and which are loaned to those who need capital and who can give sufficient security to justify the loan. Loans to the bank are called deposits; loans by the bank are called discounts. Banks of issue are those which issue bank notes which circulate as currency. In the United States the only banks of issue are those under the National Banking Law.

The deposit and discount functions of the bank have made it the chief factor in the credit upon which nine tenths of the business of the world is said to be done. Most of the deposits are made in the bank in the form of checks which the bank charges itself with the responsibility of collecting. If these checks are drawn on the bank of deposit, the bank simply deducts the amount from the account of the drawer and credits it to the account of the depositor. If the check is drawn on another bank, payment is made through the clearing house which keeps account of the orders upon the various banks or in their favor, much in the same way as the bank does for individual depositors, and settle-

ments of the actual balances between the banks are made in cash or drafts.

The interest paid by banks upon deposits varies in proportion to the extent of control of its funds that is surrendered by the depositors. In ordinary commercial banking no interest is paid upon deposits unless there is a large balance that is practically stationary. In savings banks where interest is paid all depositors, it is usual to require a notice of one month for withdrawal of funds, although this is not always insisted upon. While deposits for a specified time, called time deposits, receive still greater rates of interest. The interest rates paid by the bank and the demand period of their deposits practically govern the character of the loans which they make, thus the commercial banks paying little or no interest, must loan their money only on easily negotiable paper or collateral, such as bonds or stock which is readily converted into cash. The savings bank not finding it necessary that all of its assets may be instantly converted into cash, finds it is possible to loan money upon mortgages. Bank loans are divided between time loans for a definite period of days and nights and call loans upon which payment can be demanded at will. While either form of loan can be made upon the personal credit of the borrower, this is exceptional and safe banking disapproves of such loans except to persons of exceptional credit. Safe banking requires that the security shall be at the best, not only at the sacrifice of a possible higher rate of interest, but that an adequate reserve shall be maintained to meet the demand of the depositors in the case of a run, even though such run may be eminent. This reserve consists of either cash or assets easily convertible into cash, such as government bonds. Obviously the greater the reserve, the smaller the amount of the bank's deposit available for loans at interest, and hence the great temptation for the bankers to keep a reserve which will not be adequate in the event of a run. It is this failure to maintain a sufficient reserve which causes most of the failures of banks. The amount of this reserve except in the case of national banks, is practically at the discretion of the banker. The National Banking Laws require a minimum reserve of 25 per cent of the amount of deposit in certain large cities named in the law, and 15 per cent of the deposits in smaller cities. In New York, Chicago and St. Louis, the entire reserve must be in currency. In the other principal cities, one-half of the reserve may be deposits in the three large cities named, but at least one-half must be in currency. In the smaller cities, two-fifths of the reserve must be in cash, while the balance may be deposited in any of the reserve cities.

Banks of issue are those which issue their own bank notes which pass as currency. The exercise of this function is regulated in different nations,

and in some, as France, there is a single bank possessing this power. In England and Germany the power is vested almost entirely in one certain bank which is gradually obtaining a practical monopoly. In these and most other countries the right of note issue is based upon the amount of cash and other assets held by the bank. Until the passing of the currency act of 1908, the note issue of the United States was given to banks chartered under the federal laws only upon the security of government bonds, this provision having been made after the civil war in order to provide a means for the marketing of the unusual amount of government bonds in existence at that time. The demand for a more elastic system of currency dependent upon the actual needs of business instead of upon the amount of money that the United States government owed, led to the passage of the Aldrich-Vreeland currency act of 1908. This act provided for the formation of National Currency Associations which should authorize their members under certain conditions to issue notes to 75 per cent of the value of securities or commercial paper, or 90 per cent of the market value of state, city, town, county or other municipal bonds, but in no case shall circulated notes based on commercial paper, exceed 30 per cent of the unimpaired capital and surplus of a bank. The notes, however, cannot be issued unless the Secretary of the Treasury shall deem it advisable. All of the banks in each National Currency Association are made responsible for the notes of their members. Besides these National Currency Associations, the right is given under certain conditions to banks to issue notes on bonds other than those of the United States, of a certain character after approval by the Secretary of the Treasury. In order to prevent an increase of circulation that is not justified by actual demands of business, it is provided that the additional circulation authorized by the law, shall pay for the first month, a tax at the rate of 5 per cent a year, upon the average amount of such notes in circulation as are based upon the deposit of such authorized securities, and afterwards an additional tax of one per cent a year for each month until the tax of ten per cent a year is reached.

Although banking operations on a considerable scale appear to have been conducted by the ancients, modern banking must be regarded as having had an independent origin in the reviving civilization of the middle ages. In the 12th century almost the whole trade of Europe was in the hands of the Italian cities, and it was in these that the need of bankers was first felt. The earliest public bank, that of Venice, established in 1171 and existing down to the dissolution of the republic in 1797, was for some time a bank of deposit only, the government being responsible for the deposits, and the whole capital being in effect a public loan. In the early periods of the operations of this bank deposits could not be withdrawn, but the depositor had a



credit at the bank to the amount deposited, this credit being transferable to another person in place of money payment. Subsequently deposits were allowed to be withdrawn, the original system proving inconvenient outside the Venetian boundaries. It was, however, less from the Bank of Venice than from the Florentine bankers of the 13th and 14th centuries that modern banking specially dates, the magnitude of their operations being indicated by the fact that between 1430 and 1433, 76 bankers of Florence issued on loan nearly 5,000,000 gold florins.

The Bank of England, the most important banking establishment in the world, was projected by William Paterson, who was afterwards the promoter of the disastrous Darien scheme. It was the first public bank in the United Kingdom, and was chartered in 1694 by an act which, among other things, secured certain recompenses to such persons as should advance the sum of £1,500,000 towards carrying on the war against France. Subscribers to the loan became, under the act, stockholders, to the amount of their respective subscriptions, in the capital stock of a corporation, denominated the *Governor and Company of the Bank of England*. The company thus formed, advanced to the government £1,200,000 at an interest of 8 per cent—the government making an additional bonus or allowance to the bank of £4,000 annually for the management of this loan (which in fact, constituted the capital of the bank), and for settling the interest and making transfers, etc., among the various stockholders. This bank, like that of Venice, was thus originally an engine of the government, and not a mere commercial establishment. Its capital has been added to from time to time, the original capital of £1,200,000 having increased to £14,553,000 in 1816, since which no further augmentation has taken place. There exists, besides, however, a variable 'rest' of over £3,000,000.

Citizens of Philadelphia were originators of the first bank organized in the United States, without charter, June 17, 1780. In 1781 Robert Morris, superintendent of finance, introduced to Congress a plan for establishing the Bank of North America at Philadelphia; Dec. 31 a perpetual charter was granted to that institution. On Jan. 2, 1782, the bank opened for business. Feb. 7, 1784, was incorporated the Massachusetts Bank by the legislature of that state; this was followed March 21, 1791, by the charter of the Bank of New York, which, however, had been doing business since 1784, under 'articles of association' drawn up by Alexander Hamilton, a member of its original board of directors. All of the above, converted into national banks, are still in a prosperous condition.

Savings banks began to attract attention in the United States shortly after their inauguration in England, the first being organized in New York, 1816, but the first one to go into practical operation was in Philadelphia, of

the same year. Boston was the first to have an incorporated savings bank, this being effected Dec. 13, 1816, business being begun in 1817; the United States thus anticipated Britain in throwing about these banks the protection and sanction of law. From that time these examples have been rapidly followed. There is no uniform plan of organization. In some states there is a large number of incorporators who elect trustees and directors from among their members; again other corporators are limited in number and are themselves the trustees and managers. In the northeast trustees manage the savings banks for the depositors; elsewhere they are mostly under the control of corporations with capital stock.

An important feature in connection with the banking system is that of the *Clearing House*, which, in the United States, was first put in operation in New York, Oct. 11, 1853. Since that time this plan has been adopted in every important money center and city. Each bank in its daily dealings receives large amounts of, and checks on, other banks; thus at the close of the day's business each one has various sums due it by other banks; it is likewise the debtor of other banks who have received bills, checks and drafts drawn upon it. The settlement by means of the clearing house is simultaneously and quickly effected. The banks now having no direct business with each other save through this medium, which enables them to settle with each other every day, and with but little trouble brings each officer into intimate relations with the others, enabling them by united action to strengthen and aid each other in times of panic and financial danger.

**BANK GUARANTEE:** Law of Oklahoma making all banks liable for deposits in insolvent banks. Indorsed by Democratic national platform of 1908.

**BANK BILLS, or BANK NOTES,** paper money issued by banks, either with or without the protection of the state. Bank notes are promises to pay, but differ from ordinary notes in that they are payable on demand, never become overdue, and may be reissued when taken up.

**BANK HOLIDAYS,** days on which banks close their doors. In the United States banks do not transact business on regular holidays. Certain holidays are not observed by banks, although the custom of closing banks on days of local festivities, etc., is a growing one in the United States.

**BANKRUPT,** a person whom the law does or may take cognizance of as unable to pay his debts. Properly it is of narrower signification than insolvent, an insolvent person simply being unable to pay all his debts. Under the present bankruptcy acts in England and in the United States, proceedings in bankruptcy may be instituted by the debtor or by creditors. The former is called a voluntary, the latter an involuntary, proceeding. Each is begun by filing a petition. The debtor's petition must state that he is unable to pay his debts, and is willing to surrender all of his

property to the use of his creditors. Whether a person is liable to be adjudged a bankrupt upon the petition of creditors does not depend upon his ability or inability to pay his debts, but upon his having committed an act of bankruptcy. Such at least is the English doctrine; but it is modified to some extent in the United States. The United States Bankruptcy Statute of 1898 enumerates five classes of acts of bankruptcy. First, conveying, transferring, concealing, or removing, or permitting to be concealed or removed, any of his property with the intent to hinder, delay, or defraud any of his creditors. Second, transferring, while insolvent, any of his property with intent to prefer a creditor or creditors over others. Third, suffering, while insolvent, any creditor to obtain a preference through legal proceedings, and not securing the vacating or discharge of such preference. Fourth, making a general assignment for the benefit of creditors. Fifth, admitting in writing his inability to pay his debts, and his willingness to be adjudged a bankrupt on that ground. After the debtor is adjudicated a bankrupt, a trustee is appointed by the creditors (subject to some supervision by the Board of Trade in England, by the bankruptcy court in this country), who becomes vested not only with all the property in possession of the debtor at the time when he was adjudged a bankrupt, but with all that he had transferred in violation of the statute or in fraud of creditors. It is quite important that the trustee's title should relate back of the adjudication. Otherwise a failing debtor could always defeat one of the main purposes of the bankruptcy statute—that of securing a ratable division of all his estate among all his creditors—by turning over his property to one or more favored creditors.

**BANKS,** Nathaniel Prentiss, an American soldier, born in Massachusetts in 1816. He studied law, served as legislator of Massachusetts, and was chairman of the state constitutional convention. He was governor of Massachusetts from 1857–9, and speaker of the House of Representatives of congress. He served as major-general of Union volunteers in the civil war, and suffered many defeats. In 1864 he retired from the army and was elected to congress, where he served almost continuously until 1877. He died in 1894.

**BAN'NER,** a piece of drapery, usually bearing some warlike or heraldic device or national emblem, attached to the upper part of a pole or staff, and indicative of dignity, rank, or command.

**BANNS OF MATRIMONY,** public notice of the intended celebration of a marriage given either by proclamation, viva voce, by a clergyman, session-clerk, or precentor in some religious assembly, or by posting up written notice in some public place.

**BANNU,** a district in the northwest of Hindustan, traversed by the Indus; area, 3847 sq. miles; pop. 372,276, nearly half being Afghans.

**BANSHEE', BENSHEI',** a weird hag believed in Ireland and some parts of Scotland to attach herself to a particu-



lar house, and to appear or make her presence known by wailing before the death of one of the family.

**BANTAM FOWL**, a small but spirited breed of domestic fowl, first brought from the East Indies, supposed to derive its name from Bantam in Java. Most of the subvarieties have feathered legs; but these are not to be preferred. In point of color the black and nankeen varieties take the palm. A well-bred bantam does not weigh more than a pound.

**BANTU** (băn-tō'), the ethnological name of a group of African races below about 6° n. latitude, and including the Kaffirs, Zulus, Bechuanas, the tribes of the Loango, Congo, etc., but not the Hottentots.

**BANU**. See Bannu.

**BAN'YAN**, or **BAN'IAN**, a tree of India, of the fig genus. The most peculiar feature of this tree is its method of throwing out, from the horizontal branches, supports which take root as soon as they reach the ground, enlarge into trunks, and extending branches in their turn, soon cover a prodigious extent of ground. A celebrated banyan-tree has been known to shelter 7000



Banyan trees.

men beneath its shade. The wood is soft and porous, and from its white glutinous juice bird-lime is sometimes prepared. Both juice and bark are regarded by the Hindus as valuable medicines.

**BA'OBAB**, or **MONKEY-BREAD TREE** is one of the largest of trees, its trunk sometimes attaining a diameter of 30 feet; and as the profusion of leaves and drooping boughs sometimes almost hides the stem, the whole forms a hemispherical mass of verdure 140 to 150 feet in diameter and 60 to 70 feet high. It is a native of western Africa, and is found also in Abyssinia; it is cultivated in many of the warmer parts of the world. The roots are of extraordinary length, a tree 77 feet in girth having a tap-root 110 feet in length. The leaves are deep

green, divided into five unequal parts lanceolate in shape, and radiating from a common center. The flowers resemble the white poppy, having snowy petals and violet-colored stamens; and



Baobab tree.

the fruit, which is large and of an oblong shape, is said to taste like gingerbread, with a pleasant acid flavor. The wood is pale-colored, light, and soft. The tree is liable to be attacked by a fungus which, vegetating in the woody part, renders it soft and pith-like.

**BAP'TISM**, a rite which is generally thought to have been usual with the Jews even before Christ, being administered to proselytes. From this baptism, however, that of St. John the Baptist differed, because he baptized Jews also as a symbol of the necessity of perfect purification from sin. Christ himself never baptized, but directed his disciples to administer this rite to converts (Mat. xxviii. 19); and baptism, therefore, became a religious ceremony among Christians, taking rank as a sacrament with all sects which acknowledge sacraments. Since the Reformation there have been various Protestant sects called Baptists, holding that baptism should be administered only by immersion, and to those who can make a personal profession of faith. The Roman and Greek Catholics consecrate the water of baptism, but Protestants do not. The act of baptism is accompanied only with the formula that the person is baptized in the name of the Father, Son, and Holy Ghost; but, among most Christians, it is preceded by a confession of faith made by the person to be baptized if an adult, and by his parents or sponsors if he be a child.

**BAP'TISTS**, a Protestant sect, distinguished by their opinions respecting the mode and subjects of baptism. With regard to the mode, they maintain the necessity of immersion, and with regard to the subjects, they consider that baptism ought not to be administered to children at all, nor to adults in general, but to those only who profess repentance and faith. The Baptists as a whole adopt the Independent or Congregational form of church government, and their ecclesiastical assemblies are held for the purpose of mutual stimulus and intercourse, and not for the general government of the body, or for interference with individual churches.

**BAR**, in law, the railing that incloses the place which council occupy in courts of justice; hence the phrase, at the bar of the court, that is, in open court.

Hence also persons duly admitted as pleaders or advocates before the courts are denominated barristers, and the whole body of such barristers or advocates are called the bar. The inclosed place or dock in which persons accused of crimes stand in court is also called the bar.

**BAR**, in music, is a line drawn through the stave to mark the rhythm of small portions; the notes composing these are also called a bar.

**BARBA'DOES**, or **BARBADOS**, the most eastern of the West India Islands, first mentioned in 1518, and occupied by the British in 1625. Length 21 miles, breadth 13; area, 106,470 acres or 166 sq. miles; mostly under cultivation. It is more densely peopled than almost any spot in the world, the population in 1901 being 195,588, or about 1200 to the square mile. The climate is very hot, though moderated by the constant trade-winds; and the island is subject to dreadful hurricanes. The surface is broken, now without forests, and with few streams; the highest point is 1145 feet above the sea-level. There are few indigenous mammals or birds. The black lowland soil gives great returns of sugar in favorable seasons. The chief exports, besides sugar, are molasses and rum; imports: rice, salt meat, corn, butter, flour, etc. It is the headquarters of the British forces in the West Indies.

**BARBARIAN**, a name given by the Greeks, and afterward by the Romans, to every one who spoke an unintelligible language; and hence coming to connote the idea of rude, illiterate, uncivilized.

**BAR'BARY**, a general name for the most northerly portion of Africa, extending about 2600 miles from Egypt to the Atlantic, with a breadth varying from about 140 to 550 miles; comprising Morocco, Fez, Algeria, Tunis, and Tripoli (including Barca and Fezzan). The principal races are: the Berbers, the original inhabitants, from whom the country takes its name; the Arabs, who conquered an extensive portion of it during the times of the caliphs; the Bedouins, Jews, Turks, and the French colonists of Algeria, etc. The country, which was prosperous under the Carthaginians, was, next to Egypt, the richest of the Roman provinces, and the Italian states enriched themselves by their intercourse with it. In the 15th century, however, it became infested with adventurers who made the name of Barbary corsair a terror to commerce, a condition of things finally removed by the French occupation of Algeria.

**BARBARY APE**, a species of ape, or tailless monkey, with greenish-brown hair, of the size of a large cat, remarkable for docility, also called the magot. It is common in Barbary and other parts of Africa, and some used to live formerly on Gibraltar Rock, being the only European monkey, though probably not indigenous. It has been the "show-man's ape" from time immemorial.

**BAR'BEQUE**, a word of West Indian origin, meaning a hog, or other large animal, roasted whole.

**BARBER**, one whose occupation is to shave or trim the beard, or to cut and dress hair. The practice of surgery was



formerly a part of the craft, and by an act of Henry VIII. the Company of Barbers was incorporated with the Company of Surgeons—the company being then known as the Barber-surgeons—with the limitation, however, that the surgeons were not to shave or practice “barbery,” and the barbers were to perform no higher surgical operation than blood-letting and tooth-drawing. This continued till the time of George II. The signs of the old profession—the pole which the patient grasped, its spiral decoration in imitation of the bandage, and the basin to catch the blood—are still retained.

**BARBERS' ITCH**, a disease of the skin of the face caused by the infection of the hair follicles. It is due to a fungus, the growth of which produces ringworm. The disease yields readily to treatment. It is generally acquired from contact with the brush, lather, or hands of the barber, or the barber's towel.

**BAR'BERRY**, a genus of shrubs having bunches of small beautiful red berries, somewhat oval; serrated and pointed leaves; thorns, three together, upon the branches; and hanging clusters of yellow flowers. The berries nearly approach the tamarind in respect of acidity, and when boiled with sugar make an agreeable preserve, rob, or jelly. They are also used as a dry sweetmeat, and in sugar-plums or comfits; are pickled with vinegar, and are used for the garnishing of dishes. The bark is said to have medicinal properties, and the inner bark and roots with alum yield a fine yellow dye. The shrub was originally a native of Eastern countries, but is now generally diffused in Europe, as also in North America.

**BAR'CA**, a division of N. Africa, between the Gulf of Sidra and Egypt, a vilayet of the Turkish Empire, capital Bengazi. It formed a portion of the ancient Cyrenaica, and from the time of the Ptolemies was known as Pentapolis from its five Greek cities. Next to Bengazi the seaport of Derna is the chief town. The pop. probably does not exceed 300,000.

**BARCELONÀ** (bâr-thel-ô'nà), one of the largest cities of Spain, chief town of the province of Barcelona, and formerly capital of the kingdom of Catalonia; finely situated on the northern portion of the Spanish Mediterranean coast. Barcelona was, until the 12th century, governed by its own counts, but was afterward united with Arragon. In 1640, with the rest of Catalonia, it placed itself under the French crown; in 1652 it submitted again to the Spanish government; in 1697 it was taken by the French, but was restored to Spain at the Peace of Ryswick. Pop. 509,589.—The province has an area of 2968 sq. miles; pop. 902,970.

**BAR'CLAY**, Robert, the celebrated apologist of the Quakers, born in 1648, at Gordonstown, Moray, and educated at Paris, where he became a Roman Catholic. Recalled home by his father, he followed the example of the latter and became a Quaker. In his travels with William Penn and George Fox through England, Holland, and Germany, to spread the opinions of the

Quakers, he was received everywhere with the highest respect. The last of his productions, *On the Possibility and Necessity of an Inward and Immediate Revelation*, was not published in England till 1686; from which time Barclay lived quietly with his family. He died, after a short illness, at his own house of Ury, Kincardineshire, in 1690. He was a friend of and had influence with James II.

**BAR'COO**. See Cooper's Creek.

**BARD**, one of an order among the ancient Celtic tribes, whose occupation was to compose and sing verses in honor of the heroic achievements of princes and brave men, generally to the accompaniment of the harp. Their verses also frequently embodied religious or ethical precepts, genealogies, laws, etc.

**BARDWAN'**, or **BURDWAN'**, a division of Bengal, upon the Hugli, comprising the six districts of Bardwan, Hugli, Howrah, Midnapur, Bankura, and Birbhum. Area, 13,956 sq. miles; pop. 7,688,818.—The district Bardwan has an area of 2697 sq. miles, and a pop. of 1,391,823.

**BAREBONE**, or **BARBONE**, Praise-God, the name of a leather seller in Fleet Street, London, who obtained a kind of lead in the convention which Cromwell substituted for the Long Parliament, and which was thence nicknamed the Barebone Parliament. After its dissolution he disappears till 1660, when he presented a petition to Parliament against the restoration of the monarchy. In 1661 he was committed to the Tower for some time, but his subsequent history is unknown.

**BAREILLY** (ba-râ'li), a town of Hindustan in the United Provinces, capital of a district of same name, on a pleasant and elevated site. On the outbreak of the Indian Mutiny the native garrison took possession of the place, but it was retaken by Lord Clyde in May, 1858. Pop. 131,208.—The district has an area of 1595 sq. miles; pop. 1,040,691.

**BARGAIN AND SALE**, a legal term denoting the contract by which lands, tenements, etc., are transferred from one person to another.

**BARGE**, a term similar in origin to barque, but generally used of a flat-bottomed boat of some kind, whether used for loading and unloading vessels, or as a canal-boat, or as an ornamental boat of state or pleasure.

**BARI** (bâ'rê), a seaport, S. Italy, on a small promontory of the Adriatic capital of the province Terra di Bari. It was a place of importance as early as the 3d century B.C., and has been thrice destroyed and rebuilt. Pop. about 70,000.—The province has an area of 2280 sq. miles, and is fertile in fruit, wine, oil, etc.; pop. 679,000.

**BARIL'LA**, the commercial name for the impure carbonate and sulphate of soda imported from Spain and the Levant. It is the Spanish name of a plant, from the ashes of which and from those of others of the same genus the crude alkali is obtained. On the shores of the Mediterranean the seeds of the plants from which it is obtained are regularly sown near the sea, and these, when at a sufficient state of maturity, are pulled up, dried, and burned in

bundles in oven<sup>s</sup> or in trenches. The ashes, while hot, are continually stirred with long poles, and the saline matter they contain forms, when cold, a solid mass, almost as hard as stone. To obtain the carbonate of soda it is only requisite to lixiviate the barilla in boiling water, and evaporate the solution. British barilla or kelp is a still more impure alkali obtained from burning seaweeds. Soda is now obtained for the most part from common salt.

**BARINGS** (bâ'ring), one of the greatest commercial houses in the world. Its founder was John Baring, a German who settled in a small business in Exeter, England, in the first half of the 18th century. Two of his sons, Francis and John, established in London, in 1770, a banking-house.

In November, 1890, owing to the continued failures of the Argentine Republic to pay the interest due upon its debt, which had been guaranteed by the Barings, the firm was threatened with suspension, but was saved by the action of the Bank of England, which, in conjunction with the firm of Brown, Shipley & Co., advanced the sum of \$65,000,000 to tide over the crisis. The house of the Barings has since been reorganized as a limited company for carrying on a regular banking business, though on a less extensive scale than before.

**BAR'ITONE**, or **BAR'YTONE**, a male voice, the compass of which partakes of those of the common bass and the tenor, but does not extend so far downward as the one, nor to an equal height with the other. Its best tones are from the lower A of the bass clef to the lower F in the treble.—Also, a person having a voice of such range.

**BA'RIUM**, the metallic basis of baryta, which is an oxide of barium; it is only found in compounds, such as the common sulphate and carbonate, and was isolated by Davy for the first time in 1808. It is a yellow, malleable metal, which readily oxidizes, decomposes water, and fuses at a low temperature. Its nitrate and chlorate are used in pyrotechny.

**BARK**, the exterior covering of the stems of exogenous plants. It is composed of cellular and vascular tissue, is separable from the wood, and is often regarded as consisting of four layers: 1st, the epidermis or cuticle, which, however, is scarcely regarded as a part of the true bark; 2d, the epiphloeum, or outer cellular layer of the true bark or cortex; 3d, the mesophloeum or middle layer, also cellular; 4th, an inner vascular layer, the liber or endophloeum, commonly called bast. Endogenous plants have no true bark. Bark contains many valuable products, as gum, tannin, etc.; cork is a highly useful substance obtained from the epiphloeum; and the strength and flexibility of bast make it of considerable value. Bark used for tanning is obtained from oak, hemlock-spruce, species of acacia growing in Australia, etc. Angostura bark, Peruvian or cinchona bark, cinnamon, cascarilla, etc., are useful barks.

**BARK, PERUVIAN**, is the bark of various species of trees of the genus *Cinchona*, found in many parts of South



## BARKER

America, but more particularly in Peru, and having medicinal properties. It was formerly called Jesuit's bark, from its having been introduced into Europe by Jesuits. Its medicinal properties depend upon the presence of quinine, which is now extracted from the bark, imported, and prescribed in place of nauseous mouthfuls of bark. See Cinchona.

**BARKER'**, Jacob, an American lawyer and financier, born in Maine in 1779, died in 1871. In the war of 1812 he secured a loan of \$5,000,000 for the government. In 1815 he founded the Exchange Bank of New York, and, having removed to New Orleans, he was elected to the United States senate by the state of Louisiana at the close of the civil war, but, owing to the state not having been readmitted, he did not take his seat. He published a work on the civil war entitled *The Rebellion* (1866).

**BAR'LEY**, the name of several cereal plants, yielding a grain used as food and also for making malt, from which are prepared beer, porter, and whisky. Barley has been known and cultivated from remote antiquity, and beer was made from it among the Egyptians. The species principally cultivated are two-rowed barley, four-rowed barley, and six-rowed, of which the small variety is the sacred barley of the ancients. The varieties of the four- and six-rowed species are generally coarser than those of the two-rowed, and adapted for a poorer soil and more exposed situation. Some of these are called bere or bigg. In Britain barley occupies about the same area as wheat, but in N. America the extent of it as a crop is comparatively small, being in Canada, however, relatively greater than in the United States, and the Canadian barley is of very high quality. Barley is better adapted for cold climates than any other grain, and some of the coarser varieties are cultivated where no other cereal can be grown. Pearl barley is the grain polished and rounded and deprived of husk and pellicle. Patent barley is the farina obtained by grinding pearl barley. Barley-water, a decoction of pearl barley, is used in medicine as possessing emollient, diluent, and expectorant qualities.

**BARLEY-SUGAR**, pure sugar melted and allowed to solidify into an amorphous mass without crystallizing.

**BAR'MEN**, a German city on the Wupper, in the Prussian Rhine Province, government of Düsseldorf, and forming a continuation of the town of Elberfeld, in the valley of Barmen. Pop. 141,947.

**BAR'NABAS**, the surname given by the apostles to Josés, a fellow-laborer of Paul, and, like him, ranked as an apostle. He is said to have founded at Antioch the first Christian community, to have been first bishop of Milan, and to have suffered martyrdom at Cyprus. His festival is held on the 11th of June.

**BARNABAS**, Saint, Epistle of, an epistle in twenty-one chapters unanimously ascribed to Barnabas by early Christian writers, but without any support of internal evidence. It was probably written between 119 and 126

a.c., by one who was not a Jew, and under the influence of Alexandrian Judaistic thought.

**BAR'NACLE**, the name of a family of marine crustaceous animals. They are enveloped by a mantle and shell, composed of five principal valves and several smaller pieces, joined together by a membrane attached to their circumference; and they are furnished with a long, flexible, fleshy stalk or peduncle, provided with muscles by which they attach themselves to ships' bottoms, submerged timber, etc. They feed on small marine animals, brought within their reach by the water and secured by their tentacula. Some of the larger species are edible. According to an old fable these animals produced barnacle geese.

**BARNACLE GEESE**, summer visitors of the northern seas, in size rather smaller than the common wild goose, and having the forehead and cheeks white, the upper body and neck black.

**BARNARD**, Henry, an American educator, born in Connecticut in 1811, died in 1900. From 1837 to 1840 he was a member of the Connecticut legislature and interested himself in prison reform, meanwhile filling numerous educational positions. He was (1857-59) president of the University of Wisconsin, president of St. John's College, Annapolis (1865-66), and first U. S. commissioner of education (1867-70). He published many works on the subject of education, and was the first to use the term "tainted money" with reference to college endowments. Dr. Barnard is often called the "father of American education."

**BARNATO**, Barnett, known as "Barney Barnato, King of the Kaffirs," an English-African diamond mine owner, promoter of the Kimberley mines. He was reputed to be the richest man in the world. He was born of Hebrew stock in London, and committed suicide at sea in 1897.

**BARNAVE** (bár-náv), Antoine-Pierre-Joseph-Marie, a distinguished French revolutionist, who successfully maintained against Mirabeau the right of the National Assembly as against that of the king to declare for peace or war, but afterward asserted the inviolability of the king's person, was impeached, condemned, and guillotined. Born 1761, died 1793.

**BARNES**, Alfred Smith, an American publisher, endower of Barnes Hall at Cornell, and publisher of numerous text-books and other educational publications. He was born in Connecticut in 1817 and died in 1888.

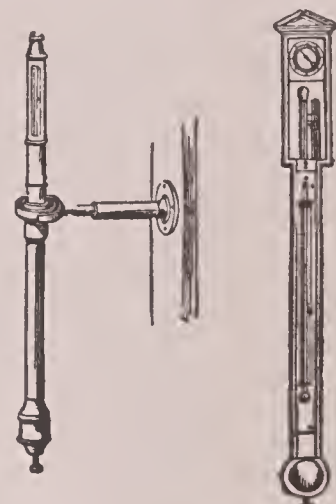
**BARNUM**, Phineas Taylor, a noted proprietor of museums and circus shows, famous the world over for his ingenuity in originating rare entertainments. He was born in Bethel, Conn., in 1810, and as a lad he edited a newspaper. At twenty-four he originated his first great sham show, in the person of a woman whom he advertised as the old nurse of George Washington. His first large venture was the American Museum in New York, the chief feature of which was "General" Tom Thumb, the dwarf. In 1847 he imported Jenny Lind, and, after becom-

## BAROMETER

ing bankrupt several times, through fire and other causes, he brought out his "Greatest Show on Earth," a traveling circus and menagerie. He died in 1891. His motto "Wait for Barnum" became a household word.

**BARO'DA**, a non-tributary state, but subordinate to the Indian government; situated in the north of the Bombay presidency. Area, 8226 sq. miles; pop. 1,952,692.—Baroda, the capital, is the third city in the Bombay presidency. Pop. 103,790 (including troops in the adjoining cantonment).

**BAROM'ETER**, an instrument for measuring the weight or pressure of the atmosphere, and thus determining changes in the weather, the height of mountains, and other phenomena. It



Marine barometer.

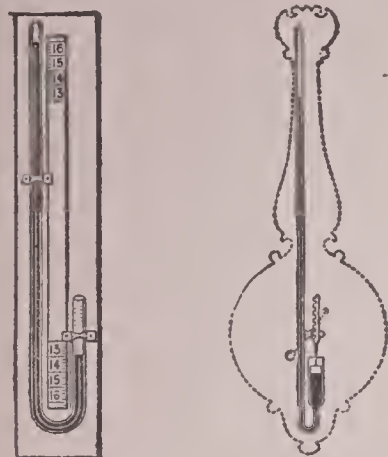
Common upright barometer.

had its origin about the middle of the 17th century in an experiment of Torricelli, an Italian, who found that if a glass tube about 3 feet in length, open at one end only, and filled with mercury, were placed vertically with the open end in a cup of the same fluid metal, a portion of the mercury descended into the cup, leaving a column only about 30 inches in height in the tube. He inferred, therefore, that the atmospheric pressure on the surface of the mercury in the cup forced it up the tube to the height of 30 inches, and that this was so because the weight of a column of air from the cup to the top of the atmosphere was only equal to that of a column of mercury of the same base and 30 inches high. Pascal confirmed the conclusion in 1645; six years afterward it was found by Perrier that the height of the mercury in the Torricellian tube varied with the weather; and, in 1665, Boyle proposed to use the instrument to measure the height of mountains.

The common or cistern barometer, which is a modification of the Torricellian tube, consists of a glass tube 33 inches in length and about one-third of an inch in diameter, hermetically sealed at the top, and having the lower end resting in a small vessel containing mercury, or bent upward and terminating in a glass bulb partly occupied by the mercury and open to the atmosphere. The tube is first filled with purified mercury, and then inverted, and there is affixed to it a scale to mark the height of the mercurial column, which com-



paratively seldom rises above 31 or sinks below 28 inches. In general the rising of the mercury presages fair weather, and its falling the contrary, a great and sudden fall being the usual presage of a storm. The weather-points



Siphon barometer. Wheel barometer.

on the ordinary barometric scale are as follows: At 28 inches, stormy weather; 28½, much rain or snow; 29, rain or snow; 29½, changeable; 30, fair or frost; 30½, settled fair or frost; 31, very dry weather or hard frost. Certain attendant signs, however, have also to be noted: thus, when fair or foul weather follows almost immediately upon the rise or fall of the mercury, the change is usually of short duration; while, if the change of weather be delayed for some days after the variation in the mercury, it is usually of long continuance. The direction of the wind has also to be taken into account.

The siphon barometer consists of a bent tube, generally of uniform bore, having two unequal legs, the longer closed, the shorter open. A sufficient quantity of mercury having been introduced to fill the longer leg, the instrument is set upright, and the mercury takes such a position that the difference of the levels in the two legs represents the pressure of the atmosphere.

The wheel barometer is the one that is most commonly used for domestic purposes. It is far from being accurate, but it is often preferred for ordinary use on account of the greater range of its scale, by which small differences in the height of the column of mercury are more easily observed. It usually consists of a siphon barometer, having a float resting on the surface of the mercury in the open branch, a thread attached to the float passing over a pulley, and having a weight as a counterpoise to the float at its extremity. As the mercury rises and falls the thread and weight turn the pulley, which again moves the index of the dial.

The mountain barometer is a portable mercurial barometer with a tripod support and a long scale for measuring the altitude of mountains.

In the aneroid barometer, as its name implies, no fluid is employed, the action being dependent upon the susceptibility to atmospheric pressure shown by a flat circular metallic chamber from which the air has been partially exhausted, and which has a flexible top and bottom

of corrugated metal plate. By an ingenious arrangement of springs and levers the depression or elevation of the surface of the box is registered by an index on the dial, by which means it is also greatly magnified, being given in inches to correspond with the mercurial barometer.

**BAR'ON**, originally, in the feudal system, the vassal or immediate tenant of any superior; but the term was afterward restricted to the king's barons, and again to the greater of these only, who attended the Great Council, or who, at a later date, were summoned by writ to Parliament. It was the second rank of nobility, until dukes and marquises were introduced and placed above the earls, and viscounts also set above the barons, who, therefore, now hold the lowest rank in the British peerage. The present barons are of three classes: (1) barons by prescription, whose ancestors have immemorially sat in the Upper House; (2) by patent; (3) by tenure, i.e. holding the title as annexed to land. The coronet is a plain gold circle with six balls or large pearls on its edge, the connected cap being of crimson velvet. —Baron and feme, a term used for husband and wife in the English law. —Baron of beef, two sirloins not cut asunder.

**BAR'ONET**, a hereditary dignity in Great Britain and Ireland, next in rank to the peerage, originally instituted by James I. in 1611. A baronet has the title of "Sir" prefixed to his Christian and surname, and his wife is "Lady" so-and-so. Baronets rank before all knights.

**BAR'RA**, or **BAR**, a small kingdom in Africa, near the mouth of the Gambia. The Mandingoes, who form a considerable part of the inhabitants, are Mohammedans and the most civilized people on the Gambia. Pop. 200,000. The coast here belongs to Britain.

**BARRAS** (bâ-râ), Paul François Jean Nicholas, Comte de, member of the French national convention and of the executive directory, born in Provence 1755, died 1829. He took part in the attack upon the Bastille and upon the Tuileries, and voted for the death of Louis XVI. In the subsequent events he displeased Robespierre, and on this account joined the members of the committee, who foresaw danger awaiting them, and being intrusted with the chief command of the forces of his party he made himself master of Robespierre. On Feb. 4, 1795, he was elected president of the convention, and on Oct. 5, when the troops of the sections which favored the royal cause approached, Barras for a second time received the chief command of the forces of the convention. On this occasion he employed General Bonaparte, for whom he procured the chief command of the army of the interior, and afterward the command of the army in Italy. From the events of the 18th Fructidor (Sept. 4, 1797) he governed absolutely until June 13th, 1799, when Siéyès entered the directory, and in alliance with Bonaparte procured his downfall in the revolution of the 18th Brumaire (Nov. 9, 1799). He afterward resided at Brussels, Marseilles, Rome, and Montpellier under sur-

veillance, returning to Paris only after the restoration of the Bourbons.

**BARREL**, a well-known variety of wooden vessel; but the term is also used as a definite measure and weight. A barrel of beer is 36 gals., of flour 196 lbs., of beef or pork 200 lbs.

**BARRETT**, Lawrence, an American player, one of the most forceful and polished actors of the American stage, born in New Jersey in 1838, died in 1891. He made his début at Detroit (1853) as Murad, in *The French Spy*. He subsequently appeared in the cities of the East, fought on the Union side in the civil war, and later became an associate of Edwin Booth. He was partner with John McCullough in the California Theater, San Francisco, and in 1875 played Cassius (his best rôle) in company with Booth. His visit to England in 1884 was entirely successful. On his return he and Booth joined forces and toured the country with splendid success in every aspect of their enterprise. His chief parts were Hamlet, Lear, Richelieu, and Shylock.

**BARRETT**, Wilson, an English player, born in 1846. His first London appearance was in 1879, and soon afterward he became manager of the Court Theater. He produced *The Lights o' London*, *The Silver King*, and other plays, and his rendition of Hamlet, Othello, and other tragic parts has been regarded with high favor. Mr. Barrett visited America in 1886, 1888, 1889, 1893, and 1897, and in 1898 Australia.

**BARREL-ORGAN**, a musical instrument usually carried by street musicians, in which a barrel studded with pegs or staples, when turned round, opens a series of valves to admit air to a set of pipes, or acts upon wire strings like those of the piano, thus producing a fixed series of tunes.

**BARRIE**, J. M., born in 1860, at Kiriemuir, Forfarshire; studied at Edinburgh University, graduating as M.A. in 1882. He was for a time connected with a Nottingham journal, and then removed to London, writing chiefly for the *St. James's Gazette*. His first book, *Better Dead*, a satire on London life, appeared in 1887. It was followed in 1888 by the highly successful *Auld Licht Idylls*, and *When a Man's Single*. In 1889 he published *A Window in Thrums*; in 1890 *My Lady Nicotine*; in 1891 *The Little Minister*; in 1896, *Sentimental Tommy*.

**BAR'RISTER**, in England and Ireland, a pleader or advocate who has been admitted to plead at the bar. In the United States the term counselor-at-law is the equivalent of the British barrister.

**BAR'ROW-IN-FUR'NESS**, a seaport, parl. and county borough of Lancashire, in the district of Furness, opposite the island of Walney, a town that has increased from a fishing hamlet with 100 inhabitants in 1848 to a town of 57,584 inhabitants in 1901. Its prosperity is due to the mines of red hematite iron-ore which abounds in the district.

**BAR'ROWS**, mounds of earth or stones raised to mark the resting-place of the dead, and distinguished, according to their shape, as long, bowl, bell, cone, broad barrows. The practice of



barrow-burial is of unknown antiquity and almost universal, barrows being found all over Europe, in northern Africa, Asia Minor, Afghanistan, western India, and in America. In the earliest barrows the inclosed bodies were simply laid upon the ground, with stone



Bowlbarrow. Long barrow. Twin barrow.

or bone implements and weapons beside them. In barrows of later date the remains are generally inclosed in a stone cist. Frequently cremation preceded the erection of the barrow, the ashes being inclosed in an urn or cist. A detailed description of an ancient barrow-burial is given in the Anglo-Saxon poem *Beowulf*.

**BARTHELMY-SAINT-HILAIRE** (bâr-tâl-mê-san-tê-lâr), Jules, French scholar and statesman, born 1805, died in 1895. He was professor of Greek and Latin philosophy in the College of France, but resigned the chair after the coup d'état of 1852 and refused to take the oath; was reappointed 1862; in 1869 was returned to the Corps Législatif; after the revolution was a member of the National Assembly; was elected senator for life in 1875.

**BARTHOLDI** (bâr-tol'dê), Auguste, French sculptor, born 1833; best known as the artist of the colossal statue of Liberty now overlooking the harbor of New York. Died 1904.

**BARTHOL'OMEW**, the apostle, is probably the same person as Nathanael, mentioned in the Gospel of St. John as an upright Israelite and one of the first disciples of Jesus. He is said to have taught Christianity in the south of Arabia, into which, according to Eusebius, he carried the Gospel of St. Matthew in the Hebrew language; and to have suffered martyrdom. The ancient church had an apocryphal gospel bearing his name, of which nothing has been preserved. A festival is held to his memory on August 24th.

**BARTHOLOMEW'S DAY**, St., a feast of the Christian Church, celebrated (August 24) in honor of St. Bartholomew. What is known as the Massacre of St. Bartholomew was the slaughter of the French Protestants, which began on August 24th, 1572, by secret orders from Charles IX., at the instigation of his mother, Catharine de Medici, and in which, according to Sully, 70,000 Huguenots, including women and children, were murdered throughout the

country. During the minority of Charles and the regency of his mother a long war raged in France between the Catholics and Huguenots, the leaders of the latter being the Prince of Condé and Admiral Coligny. In 1570 overtures were made by the court to the Huguenots, which resulted in a treaty of peace. This treaty blinded the chiefs of the Huguenots, particularly the Admiral Coligny, who was wearied with civil war. The king appeared to have entirely disengaged himself from the influence of the Guises and his mother; he invited Coligny to his court, and honored him as a father. The most artful means were employed to increase this delusion. The sister of the king was married to the Prince de Béarn (Aug. 18, 1572) in order to allure the most distinguished Huguenots to Paris. On Aug. 22 a shot from a window wounded the admiral. The king hastened to visit him, and swore to punish the author of the villainy; but on the same day he was induced by his mother to believe that the admiral had designs on his life. "God's death!" he exclaimed; "kill the admiral; and not only him, but all the Huguenots; let none remain to disturb us." The following night Catharine held the bloody council, which fixed the execution for the night of St. Bartholomew, August 24, 1572. After the assassination of Coligny a bell from the tower of the royal palace at midnight gave to the assembled companies of burghers the signal for the general massacre of the Huguenots. The Prince of Condé and the King of Navarre saved their lives by going to mass and pretending to embrace the Catholic religion. By the king's orders the massacre was extended throughout the whole kingdom; and the horrible slaughter continued for thirty days in almost all the provinces.

**BARTLETT**, John, an American editor, widely known from his compilation, *Bartlett's Familiar Quotations*. He was born at Plymough, Mass., 1820, and has been for many years partner in the house of Little, Brown & Co., of Boston.

**BARTLETT**, John Russell, an American ethnologist and author, born at Providence, R. I., in 1805. In 1850-54 he surveyed the boundary line between the United States and Mexico, and was secretary of state for Rhode Island (1855-72). He is the author of several works on ethnological subjects, and has published valuable lexicons and histories of American countries. He died in 1886.

**BARTLETT**, Josiah, an American statesman, born at Amesbury, Mass., in 1729. He was a delegate to the continental congress in 1775, was chief justice of New Hampshire court of common pleas (1779), justice of the state supreme court (1784), and chief justice (1778). He was the first governor of New Hampshire. He died in 1795.

**BARTLETT**, Paul Wayland, an American sculptor, born at New Haven, Conn., 1865. He is the sculptor of the McClellan statue in Philadelphia, of the Warren statue in Boston, and of the statue of Lafayette presented to France by the school children of the United States.

**BARTON**, Clara, president of the American Red Cross Society and its founder. She was born in Massachusetts in 1830, entered the hospital service in the civil war, and did much good work. She was visiting Europe at the outbreak of the Franco-Prussian war, and served in the hospital service of the German army. She was decorated with the Iron Cross of Germany and the Gold Cross of Baden. Miss Barton represented the United States Red Cross Society in several international meetings, did relief work in America in 1896, and in the late Spanish war and the Anglo-Boer war in Africa. She has published two histories of the Red Cross movement.

**BARTRAM**, John, an American botanist, born in Pennsylvania in 1699. He became distinguished as a botanist early in life and was a correspondent of Linné, who praised him as the greatest natural botanist in the world. His works were printed in the *Transactions of the Philosophical Society*, and also in the form of books. He died in 1777.

**BARTRAM**, William, son of John Bartram, and, like his father, a botanist of distinction. He was born in Pennsylvania in 1739 and died in 1823. He published a list of American birds, in addition to his botanical studies.

**BARYTA**, oxide of barium, called also heavy earth, from its being the heaviest of the earths. It is generally found in combination with sulphuric and carbonic acids, forming sulphate and carbonate of baryta, the former of which is called heavy-spar. Baryta is a gray powder, has a sharp, caustic, alkaline taste, and a strong affinity for water, and forms a hydrate with that element. It forms white salts with the acids, all of which are poisonous except the sulphate. Several mixtures of sulphate of baryta and white-lead are manufactured, and are used as white pigments, or it may be used alone. Carbonate of baryta, which in the natural state is known as witherite, is also used as the base of certain colors. The nitrate is used in pyrotechny, in the preparation of green fireworks.

**BASALT** (ba-salt'), a well-known igneous rock occurring in the ancient trap and the recent volcanic series of rocks, but more abundantly in the former. It is a fine-grained heavy crystalline rock, consisting of felspar, augite, and magnetic iron, and sometimes contains a little olivine. Basalt is amorphous, columnar, tabular, or globular. The columnar form is straight or curved, perpendicular or inclined, sometimes nearly horizontal; the diameter of the columns from 3 to 18 inches, sometimes with transverse semispherical joints, in which the convex part of one is inserted in the concavity of another; and the height from 5 feet to 150. The forms of the columns generally are pentagonal, hexagonal, or octagonal. When decomposed it is found also in round masses, either spherical or compressed and lenticular. These rounded masses are sometimes composed of concentric layers, with a nucleus, and sometimes of prisms radiating from a center. Fingal's Cave, in the island of Staffa, furnishes a remarkable instance of basal-



## BASE

tic columns. The pillars of the Giant's Causeway, Ireland, composed of this stone, and exposed to the roughest sea for ages, have their angles as perfect as



Basalt—Lot's wife, St. Helena.

those at a distance from the waves. Basalt often assumes curious and fantastic forms, as for example Lot's wife near the south coast of St. Helena.

**BASE**, in architecture, that part of a column which is between the top of the pedestal and the bottom of the shaft; where there is no pedestal, the part between the bottom of the column and the pavement. The term is also applied to the lower projecting part of the wall of a room, consisting of a plinth and its moldings.

**BASEBALL**, the national field game of the United States, a development of

with bases, or goals, at each corner. One is called the home base, the others from right to left of home are called first, second, and third bases. The three last named bases are guarded by the first, second, and third basemen. A player called the shortstop guards the space between second and third bases. These four are the infield. The outfield consists of three players, right, center, and left, placed at some distance from the bases. The pitcher stands 55 feet from the home base and delivers the ball over that base to the catcher, who stands just behind the base. This is the make-up of the team "in the field." The men of the team that has the "innings" come to bat one after another. The batsman tries to hit the ball and to reach first base before the ball can be "fielded" to first base, or before one of the opposing team can touch him with it. If the ball reaches the first baseman and is held by him, or if the batsman is touched before reaching the first base, he is retired from the play and

when touched with the ball in the hands of a fielder while between bases; when, if forced to run to any base, the ball is held by a fielder on that base before the runner reaches it; and when hit by a batted ball.

When three men are out the side is out and the team in the field becomes batsmen. The object of the base-runner is to reach in succession first, second, third and home base without being "put out." He then "scores a run." Nine innings constitute a game and the side having most runs at the end of the ninth inning is the winner.

Baseball is played in the United States by several large professional leagues and innumerable small amateur leagues, associations, and clubs. Several millions of dollars are invested in the business.

**BASEL** (bä'zl), a canton and city of Switzerland. The canton borders on Alsace and Baden, has an area of 176 sq. miles, and a population of 180,697, nearly all speaking German. It is



Basel, from above the town.

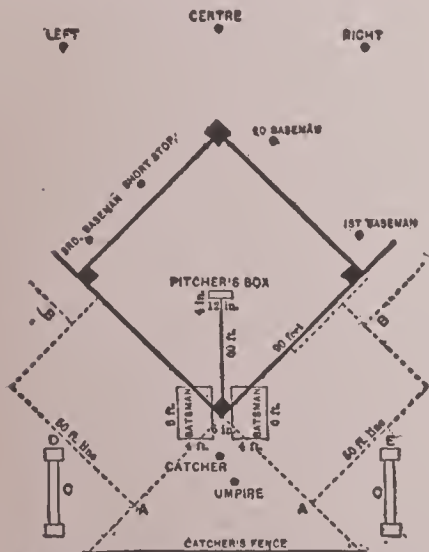
is "out" of the game, and another batsman takes his place. If the batsman knocks the ball into the air and it is caught and held before touching the ground; or if the batsman strikes three times at the ball and misses it, the ball being caught by the catcher on the last missed strike; or if the striker doesn't try to hit the ball when the ball is judged to have been delivered over the home base according to rule, the striker is out.

The batsman becomes a base-runner after three strikes are called; when he makes a fair hit, the ball traveling between the above-mentioned lines until after it passes first or third base; after four balls have been called by the umpire, a "ball" being a pitched ball which is not touched by the bat and which passes outside the limits required for a strike; if he is hit by the ball, unless he has made no effort to avoid it; after the umpire calls a "balk"; and if prevented from striking by the interference of the catcher. In the last four cases he cannot be put out before reaching first base. He is put out when his third strike is held by the catcher; when a ball hit by him is caught by a fielder before it touches the ground;

divided into two half-cantons, Basel city and Basel country. At Basel was signed the treaty of peace between France and Prussia, April 5, and that between France and Spain, July 22, 1795. Pop. (with suburbs), 111,009.

**BASEMENT**, the lowest story of a dwelling-house or other building. The basement in America is usually lower than the level of the ground, the first story being higher than the ground level. In medieval Europe all great houses were built with a basement, called in England the "ground floor." This was level with the ground and was used for servants quarters, offices, etc.

**BASE OF OPERATIONS**, the place in which an army keeps its main stores and supplies when in war, and from which the campaign is carried on against an enemy. The invaders of a country often find the maintenance of a base of operations a serious matter, for properly to guard it requires large numbers of men. Lines leading from the base must also be guarded; and these necessities make it more or less easy for a small number of men to defeat and drive out a large invading army.



AA, ground reserved for batsman, umpire, and catcher; BB, for captain and assistant; CC, players' benches; D, bat-rack for visiting players; E, for home players.

the old English game of "rounders." It is played by two teams of 9 men each, with an elastic ball about 9 inches in circumference. The field consists of a level ground, part of which is laid out in a "diamond," 90 feet square,



**BASHI-BAZOOKS'**, irregular troops in the Turkish army. They are mostly Asiatics, and have had to be disarmed several times by the regular troops on account of the barbarities by which they have rendered themselves infamous.

**BASH'KIRS**, a tribe of Finnish or of Tatar origin, inhabiting the Russian governments of Ufa, Orenburg, Perm, and Samara. They are rude and warlike and partially nomadic. They number about 500,000.

**BASIC SLAG**, the slag or refuse matter which is got in making basic steel, and which from the phosphate of lime it contains is a valuable fertilizer.

**BASIC STEEL**. See Steel.

**BASIL**, St., called the Great, one of the Greek fathers, was born in 329, and made in 370 Bishop of Cæsarea in Cappadocia, where he died in 379. He was distinguished by his efforts for the regulation of clerical discipline, and, above all, his endeavors for the promotion of monastic life. The Greek Church honors him as one of its most illustrious saints, and celebrates his festival January 1. The vows of obedience, chastity, and poverty framed by St. Basil are essentially the rules of all the orders of Christendom.

**BASILICA**, originally the name applied by the Romans to their public halls, either of justice, of exchange, or other business. The plan of the basilica was usually a rectangle divided into aisles by rows of columns, the middle aisle being the widest, with a semi-circular apse at the end, in which the tribunal was placed. The ground-plan of these buildings was generally followed in the early Christian churches, which, therefore, long retained the name of basilica, and it is still applied to some of the churches in Rome by way of distinction, and sometimes to other churches built in imitation of the Roman basilicas.

**BASILICA'TA**, also called **POTENZA**, an Italian province, extending north from the Gulf of Taranto, and corresponding pretty closely with the ancient Lucania. Area, 4122 sq. miles; pop. 524,485.

**BAS'ILISK**, a fabulous creature formerly believed to exist, and variously regarded as a kind of serpent, lizard, or dragon, and sometimes identified with the cockatrice. It inhabited the deserts of Africa, and its breath and even its look was fatal.

**BAS'IN**, in physical geography, the whole tract of country drained by a river and its tributaries. The line dividing one river basin from another is the water-shed; and by tracing the various water-sheds we divide each country into its constituent basins. The basin of a loch or sea consists of the basins of all the rivers which run into it.—In geology a basin is any dipping or disposition of strata toward a common axis or center, due to upheaval and subsidence.

**BASKET**, a vessel or utensil of wickerwork, made of interwoven osiers or willows, rushes, twigs, grasses, etc. The process of basket-making is very simple, and appears to be well known among the very rudest peoples. The ancient

Britons excelled in the art, and their baskets were highly prized in Rome.

**BASKET-BALL**, a game played with an inflated bladder 30 inches in circumference and weighing about 20 ounces. Goals, consisting of nets, are placed at either end of the field, and are suspended from metal rings. The teams consist of five players each—left and right guard, center, and right forward—and the object is to put the ball in the opposing team's goal-basket. The ball must be thrown or batted with the hands. No tackling, kicking, pushing, etc., are allowed. The penalty is a free throw at 15 feet for the basket by the opposing team. A goal thus made counts one point; a goal from the field, 15. The game was invented by James Naismith, of Plainfield, Mass.

**BASKING-SHARK**, a species of shark, so named from its habit of basking in the sun at the surface of the water. It reaches the length of 40 feet, and its liver yields a large quantity of oil. It frequents the northern seas, and is known also as the sail-fish or sun-fish.

**BASQUES** (bâsks), or **BISCAYANS**, a remarkable race of people dwelling partly in the southwest corner of France, but mostly in the north of Spain adjacent to the Pyrenees. They are probably descendants of the ancient Iberi, who occupied Spain before the Celts. They preserve their ancient language, former manners, and national dances, and make admirable soldiers, especially in guerrilla warfare. Their language is highly polysynthetic, and no connection between it and any other language has as yet been made out. There are four principal dialects, which are not only distinguished by their pronunciation and grammatical structure, but differ even in their vocabularies. The Basques, who number about 600,000, occupy in Spain the provinces of Biscay, Guipuzcoa, and Alâva; in France parts of the departments of the Upper and Lower Pyrenees, Ariège, and Upper Garonne.

**BAS-RELIEF** (bâ'rê-lêf or bas'rê-lêf), **BASS-RELIEF**, low-relief, a mode of sculpturing figures on a flat surface, the figures having a very slight relief or pro-



Bas-relief, from the Elgin Marbles.

jection from the surface. It is distinguished from haut-relief, or high-relief, in which the figures stand sometimes almost entirely free from the ground. Bas-relief work has been described as "sculptured painting" from the capability of disposing of groups of figures and exhibiting minor adjuncts, as in a painting.

**BASS** (bās), in music, the lowest part in the harmony of a musical composition, whether vocal or instrumental. According to some it is the fundamental or most important part, while others regard the melody or highest part in that light. Next to the melody, the bass part is the most striking, the freest and boldest in its movements, and richest in effect.

**BASS** (bās), the name of a number of fishes of the perch family, distinguished from the true perches by having the tongue covered by small teeth and the preoperculum smooth. The only British species, called sea-dace, and from its voracity sea-wolf, resembles somewhat the salmon in shape, and is much esteemed for the table, weighing about 15 lbs. Striped bass, an American species, weighing from 25 to 30 lbs., is much used for food, and is also known as rock-fish. Two species of black bass, American fresh-water fishes, are excellent as food and give fine sport to the angler. The former is often called the large-mouthed black bass, from the size of its mouth. Both make nests and take great care of their eggs and young.

**BASS** (bās) **DRUM**, a musical instrument of percussion. It has a cylindrical body of wood, over both ends of which a membrane is stretched tightly by means of hoops. The bass drum is played by beating either one or both heads with sticks having soft, padded knobs at their ends. See Drum.

**BASSEIN** (bas-sân'), a town in Lower Burmah, province of Pegu, on both banks of the Bassein river, one of the mouths of the Irrawaddy, and navigable for the largest ships. Pop. 31,864.—Bassein District has an area of 6848 sq. miles and a pop. of 475,002.

**BAS'SETT**, James, an American missionary, born in 1834, near Hamilton, Ont. In 1871 he became a missionary for the Presbyterian Board and traveled widely throughout Europe, spending many years in Turkey and Persia. He is believed to have been the first American to penetrate as far east as the tomb of Harun-al-Rashid at Meshed, eastern Khorassan. He founded the mission in eastern and central Persia, and did much to effect the appointment of a United States legation to Persia.

**BASSOON'**, a musical wind-instrument of the reed order, blown with a bent metal mouthpiece, and holed and keyed like the clarinet. Its compass comprehends three octaves rising from B flat below the bass-staff.

**BASS'ORA**, or **BASRAH**, a city in Asiatic Turkey, on the west bank of the Shat-el-Arab (the united stream of the Tigris and Euphrates), about 50 miles from its mouth, and nearly 300 southeast of Bagdad. Thirty years ago the inhabitants were estimated at 5000; they are now about 40,000; but in the 18th century they were said to number 150,000. The ruins of the ancient and more famous Bassora—founded by Caliph Omar in 636, at one time a center of Arabic literature and learning and regarded as "the Athens of the East"—lie about 9 miles southwest of the modern town.

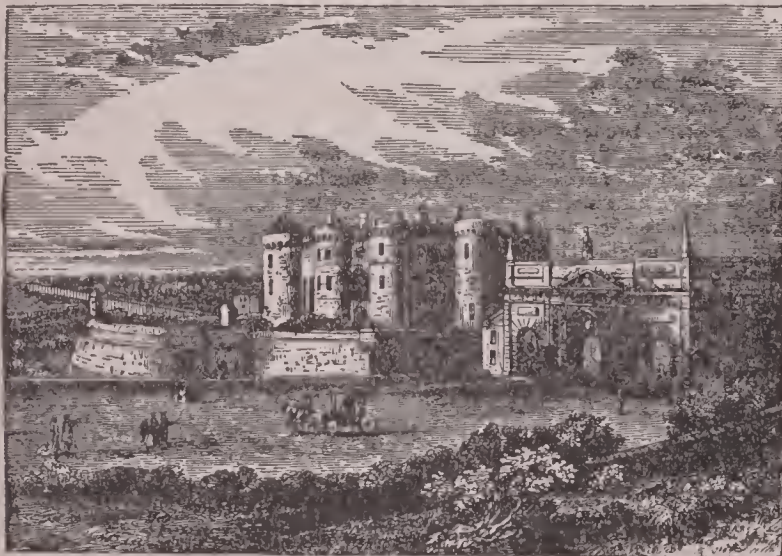
**BASSWOOD**, **BASS**, the American lime-tree or linden, common in North



America, yielding a light, soft timber.

**BAS'TARD**, a child begotten and born out of wedlock; an illegitimate child. By the civil and canon laws, and by the law of Scotland (as well as of some of the United States), a bastard becomes legitimate by the intermarriage of the parents at any future time. But by the laws of England a child, to be legitimate, must at least be born after the lawful marriage; it does not require that the child shall be begotten in wedlock, but it is indispensable that it should be born after marriage, no matter how short the time, the law presuming it to be the child of the husband. The only incapacity of a bastard is that he cannot be heir or next of kin to any one save his own issue. In England the maintenance of a bastard in the first instance devolves on the mother, while in Scotland it is a joint burden upon both parents. The mother is entitled to the custody of the child in preference to the father, and the father may be required to support the child.

**BASTILLE** (bàs-têl'), a French name for any strong castle provided with towers, but as a proper name the state prison and citadel of Paris, which was built about 1370 by Charles V. It was



The Bastille, as in time of Louis XV.

ultimately used chiefly for the confinement of persons of rank who had fallen victims to the intrigues of the court or the caprice of the government. The capture of the Bastille by the Parisian mob, 14th July, 1789, was the opening act of the revolution. On that date the Bastille was surrounded by a tumultuous mob, who first attempted to negotiate with the governor Delaunay, but, when these negotiations failed, began to attack the fortress. For several hours the mob continued their siege without being able to effect anything more than an entrance into the outer court of the Bastille; but at last the arrival of some of the Royal Guard with a few pieces of artillery forced the governor to let down the second drawbridge and admit the populace. The governor was seized, but on the way to the hôtel de ville he was torn from his captors and put to death. The next day the destruction of

the Bastille commenced. Not a vestige of it exists, but its site is marked by a column in the Place de la Bastille.

**BASTINA'DO**, an Eastern method of corporal punishment, consisting of blows upon the soles of the feet, applied with a stick.

**BASU'TOLAND**, a native province and British South African possession, inclosed between Orange River Colony, Natal, Griqualand East, and Cape Colony. The Basutos belong chiefly to the great stem of the Bechuanas, and have made greater advances in civilization than perhaps any other South African race. Basutoland has an area of about 10,300 sq. miles, much of it covered with grass, and there is but little wood. The climate is pleasant. The natives keep cattle, sheep, and horses, cultivate the ground, and export grain. It is divided into four districts, each presided over by a magistrate. Pop. (Europ.), 578; (native), 250,000.

**BAT**, one of the group of wing-handed, flying mammals, having the fore-limb peculiarly modified so as to serve for flight. Bats are animals of the twilight and darkness, and are common in temperate and warm regions, but are most numerous and largest in the tropics. All European bats are small,

mischief in orchards. At least two species of South American bats are known to suck the blood of other mammals, and thence are called "vampire-bats." As winter approaches, in cold



Great horseshoe bat.

climates bats seek shelter in caverns, vaults, ruinous and deserted buildings, and similar retreats, where they cling together in large clusters, hanging head downward by the feet; and remain in a torpid condition until the returning spring recalls them to active exertions. Bats generally bring forth two young, which, while suckling, remain closely attached to the mother's teats, which are two, situated upon the chest. The parent shows a strong degree of attachment for her offspring, and, when they are captured, will follow them, and even submit to captivity herself rather than forsake her charge.

**BATA'VIA**, a city and seaport of Java, on the north coast of the island, the capital of all the Dutch East Indies. Its inhabitants are chiefly Malay, with a considerable admixture of Chinese and a small number of Europeans. Pop. 115,600.

**BATAVIANS**, an old German nation which inhabited a part of the present Holland, especially the island called Batavia, formed by that branch of the Rhine which empties itself into the sea near Leyden, together with the Waal and the Meuse. Tacitus asserts them to have been a branch of the Catti. They were subdued by Germanicus, and were granted special privileges for their faithful services to the Romans, but revolted under Vespasian. They were, however, again subjected by Trajan and Adrian, and at the end of the 3d century the Salian Franks obtained possession of the island of Batavia.

**BATEMAN**, Kate Josephine, an American actress, born in Baltimore, 1842, and appeared at twenty as Juliet, Julia, Pauline, Lady Macbeth, and other tragic rôles. She visited England in 1863, married George Crowe, retired until 1868, and reappeared as Medea in 1872. In 1875 Miss Bateman appeared with Irving in Macbeth.

**BATES**, Arlo, an American author and poet, born in Maine in 1850. He has been editor of the Boston Courier and professor of English in the Massachusetts Institute of Technology. He has published *The Pagans*, *The Wheel of Fire*, *The Philistines*, *The Puritans*, and *Love in a Cloud*. His poems appeared in 1886, 1887, and 1891.

**BATES**, Blanche, an American actress, born at Portland, Oregon, 1873. She made her first appearance in San Francisco. She has played leading parts in *The Senator*, *The Charity Ball*, *A Doll's House*, *The Great Ruby*, *The*

and have a mouse-like skin. The body of the largest British species is less than that of a mouse, but its wings stretch about 15 inches. During the day it remains in caverns, in the crevices of ruins, hollow trees, and such-like lurking-places, and flits out at evening in search of food, which consists of insects. Several species of the same genus are common in North America. Many bats are remarkable for having a singular nasal cutaneous appendage, bearing in some cases a fancied resemblance to a horseshoe. Bats may be conveniently divided into two sections: the insectivorous or carnivorous, comprising all European and most African and American species; and the fruit-eating, belonging to tropical Asia and Australia, with several African forms. An Australian fruit-eating bat, commonly known as the kalong or flying-fox, is the largest of all the bats; it does much



Three Musketeers, and Under Two Flags.

**BATES**, Charlotte Fiske, an American author, born in New York in 1838. She has published several volumes of poetry (1879, 1881, and 1882). She married (1891) M. Adolphe Rogé.

**BATH** (báth), a city of England in Somersetshire, on the Avon, which is navigable for barges from Bristol. Bath is remarkable for its medicinal waters, the four principal springs yielding no less than 184,000 gallons of water a day; and the baths are both elegant and commodious. The temperature of the springs varies from 109° to 117° Fahrenheit. They contain carbonic acid, chloride of sodium and of magnesium, sulphate of soda, carbonate and sulphate of lime, etc. Pop. 52,751.

**BATH**, a town in Maine, on the west side and at the head of the winter navigation of the Kennebec, 12 miles from the sea. Chief industries: ship-building and allied crafts. Pop. 10,477.

**BATH**, the immersion of the body in water, or an apparatus for this purpose. The use of the bath as an institution, apart from occasional immersion in rivers or the sea, is, as might be anticipated, an exceedingly old custom. Homer mentions the bath as one of the first refreshments offered to a guest; thus, when Ulysses enters the palace of Circe, a bath is prepared for him, and he is anointed after it with costly perfumes. No representation, however, of a bath as we understand it is given upon the Greek vases, bathers being represented either simply washing at an elevated basin, or having water poured over them from above. In later times, rooms, both public and private, were built expressly for bathing, the public baths of the Greeks being mostly connected with the gymnasia. Apparently, by an inversion of the later practice, it was customary in the Homeric epoch to take first a cold and then a hot bath; but the Lacedemonians substituted the hot-air sudorific bath, as less enervating than warm water, and in Athens at the time of Demosthenes and Socrates the warm bath was considered by the more rigorous as an effeminate custom. With respect to modern baths, that commonly in use in Russia consists of a single hall, built of wood, in the midst of which is a powerful metal oven, covered with heated stones, and surrounded with broad benches, on which the bathers take their places. Cold water is then poured upon the heated stones, and a thick, hot steam rises, which causes the sweat to issue from the whole body. The bather is then gently whipped with wet birch rods, rubbed with soap, and washed with luke-warm and cold water; of the latter, some pailfuls are poured over his head; or else he leaps, immediately after this sweating-bath, into a river or pond, or rolls in the snow. The Turks, by their religion, are obliged to make repeated ablutions daily, and for this purpose there is, in every city, a public bath connected with a mosque. A favorite bath among them, however, is a modification of the hot-air sudorific-bath of the ancients introduced under the name of "Turkish"

into other than Mohammedan countries. A regular accompaniment of this bath, when properly given, is the operation known as "kneading," generally performed at the close of the sweating process, after the final rubbing of the bather with soap, and consisting in a systematic pressing and squeezing of the whole body, stretching the limbs, and manipulating all the joints as well as the fleshy and muscular parts.

Public free baths have been opened in several cities of the United States with reasonable success. Public baths (for the payment of a fee) are operated in all the cities of America, and some of them are superior to the best establishments in Europe. The Sutro baths at the Cliff House in San Francisco, which were not damaged by the recent earthquake, are the finest baths in the world, surpassing in size and luxury the greatest of the ancient Roman baths. Salt water is let in directly from the Pacific Ocean and a huge amphitheater seating several thousand spectators surrounds the pools. The most famous bathing springs in America are those at Hot Springs, Ark., and Mount Clemens, Mich., which are regarded as a cure for rheumatism and other diseases.

**BÁTHOS**, a Greek word meaning depth, now used to signify a ludicrous sinking from the elevated to the mean in writing or speech. First used in this sense by Pope.

**BATHYBŪS**, the name given by Huxley to what was regarded as masses of animal matter found covering the seabottom at great depths, and in such abundance as to form in some places deposits of 30 feet or more in thickness. It has been described as a tenacious, viscid, slimy substance, exhibiting under the microscope a network of granular, mucilaginous matter, which expands and contracts spontaneously, and thus forms an organism of the utmost simplicity corresponding in every respect to protoplasm. But the existence of such a substance has been a matter of dispute among scientists.

**BA'TON**, a short staff or truncheon, in some cases used as an official badge, as that of a field-marshal. The conductor of an orchestra has a baton for the purpose of directing the performers as to time, etc.

**BAT'ON ROUGE** (rōzl), the capital of Louisiana, on the left bank of the Mississippi, with an arsenal, barracks, military hospital, state-house, state university, etc. On Aug. 5, 1862, the Confederates under General Breckenridge suffered a severe defeat before it. Pop. 12,000.

**BATRACHIANS** (ba-trā'ki-anz), the fourth order in Cuvier's arrangement of the class Reptilia, comprising frogs, toads, newts, salamanders, and sirens. The term is now often employed as synonymous with amphibia, but is more usually restricted to the order Anura or tailless amphibia.

**BATTAL'ION**, the tactical unit of command in infantry, supposed to be of the maximum strength to be efficiently handled by one officer.

**BATTERING-RAM**, an engine for battering down the walls of besieged places. The ancients employed two

different engines of this kind—one suspended in a frame, the other movable on wheels or rollers. They consisted of a beam or spar with a massive metal head, and were set in motion either by a direct application of manual force or



Battering-ram.

by means of cords passing over pulleys. Some are said to have been 120 feet or more in length, and to have been worked by 100 men. One is described as being 180 feet long, and having a head weighing 1½ tons. They were generally covered with a roof or screen for the protection of the workers.

**BAT'TERSEA**, a municipal borough of London, in Surrey. Pop. in 1901, 168,896.

**BAT'TERY**, as a military term, (1) any number of guns grouped in position for action; (2) any work constructed as a position for such guns; (3) the tactical unit of field-artillery, more properly described as a field-battery.

**BATTERY**, in physics, a combination of several jars or metallic plates, to increase the effect of electricity and galvanism.

**BATTERY**, in criminal law, an assault by beating or wounding another. The least touching or meddling with the person of another against his will may be held to constitute a battery.

**BATTERY**, The, a small park at the extreme southern point of Manhattan (New York City), which was formerly in Dutch times a fortified place. In early New York the Battery was the most aristocratic residence portion of the city.

**BATTLE-AX**, a weapon much used in war in the early part of the middle ages among knights. It is a weapon which affords hardly any guard, and the heavier the blow given with it the more the fighter is exposed; but its use was to some extent necessitated by the resistance of iron armor to all but heavy blows. In England and Scotland the battle-ax was much employed, the Lochaber-ax remaining a formidable implement of destruction in the hands of the Highlanders to a recent period.

**BATTLE CREEK**, a town in Michigan, at the junction of the Kalamazoo and Battle Creek, with a college, and manufactures of agricultural implements, health foods, etc. Pop. 20,000.

**BAT'TLEMENT**, a notched or indented parapet of a fortification, formed by a series of raised parts called cops or merlons, separated by openings called crenelles or embrasures, the soldier sheltering himself behind the merlon while he fires through the embrasure. Battlements were originally military, but were afterward used freely in ecclesiastical and civil buildings by way of ornament, on parapets, cornices, tabernacle work, etc.



**BAUXITE** (bak'sit), a clay found at Baux, near Arles in France, and exported from the north of Ireland, containing a large proportion of alumina, and used as a lining for furnaces that have to support an intense heat, and as a source of aluminium.

**BAVA'RIA**, a kingdom in the south of Germany, the second largest state of the empire, composed of two isolated portions, the larger comprising about eleven-twelfths of the monarchy, having the Austrian territories on the east, and Württemberg, Baden, etc., on the west, while the smaller portion, the Pfalz or Palatinate, is separated from the other by Württemberg and Baden, and lies west of the Rhine; total area, 29,657 sq. miles. The main political divisions are: Upper Bavaria (pop. 1,319,985; chief town, Munich, the capital of the kingdom, pop. 499,959); Lower Bavaria (677,973); Palatinate (830,948); Upper Palatinate and Regensburg (555,204); Upper Franconia (607,308); Middle Franconia (814,294); Lower Franconia and Aschaffenburg (650,624); Schwaben and Neuburg (712,056); total 6,168,392.

As regards soil Bavaria is one of the most fertile countries in Germany, producing the various cereals in abundance, the best hops in Germany, fruit, wine, tobacco, etc., and having extensive forests. Lower Franconia (the Main valley) and the Palatinate are the great vine-growing districts. The celebrated Steinwein and Leistenwein are the produce of the slopes of the Steinberg and Marienberg at Würzburg (on the Main). The forests of Bavaria, chiefly fir and pine, yield a large revenue; much timber being annually exported, together with potash, tar, turpentine, etc. The principal mineral products are salt, coal, and iron, some of the mining works belonging to the state. The minerals worked include copper, quicksilver, manganese, cobalt, porcelain clay, alabaster, graphite. Large numbers of horses and cattle are reared, as also sheep and swine. The manufactures are individually mostly on a small scale. The principal articles manufactured are linens, woollens, cottons, leather, paper, glass, earthen and iron ware, jewelry, etc. The optical and mathematical instruments made are excellent. A most important branch of industry is the brewing of beer, for which there are upward of 7000 establishments, producing over 260 millions of gallons a year.

Education is in a less satisfactory condition than in most German states. There are about 7000 elementary schools, on which attendance is compulsory up to fourteen years of age. There are three universities, two of which (Munich and Würzburg) are Roman Catholic, and one (Erlangen) Protestant. In art Bavaria is best known as the home of the Nürnberg school, founded about the middle of the 16th century by Albert Dürer. Hans Holbein is also claimed as a Bavarian; and to these have to be added the eminent sculptors Kraft and Vischer, both born about the middle of the 15th century. The restoration of the reputation of Bavaria in art was chiefly the work of Ludwig I., under whom the capital became one of the

most prominent seats of the fine arts in Europe.

The Bavarian crown is hereditary in the male line. The executive is in the hands of the king. The legislature consists of two chambers.

The Bavarians take their name from the Boii, a Celtic tribe whose territory was occupied by a confederation of Germanic tribes, called after their predecessors Boiarii. These were made tributary first to the Ostrogoths, and then to the Franks; and on the death of Charlemagne his successors governed the country by lieutenants with the title of margrave, afterward converted (in 921) into that of duke. In 1070 Bavaria passed to the family of the Guelphs, and in 1180 by imperial grant to Otho, count of Wittelsbach, founder of the still reigning dynasty. In 1623 the reigning duke was made one of the electors of the empire. Elector Maximilian II. joined in the war of the Spanish succession on the side of France, and this led, after the battle of Blenheim, 1704, to the loss of his dominions for the next ten years. His son, Charles Albert, likewise lost his dominions for a time to Austria, but they were all recovered again by Charles's son, Maximilian III. (1745). In the wars following the French revolution Bavaria was in a difficult position between France and Austria, but latterly joined Napoleon, from whom its elector Maximilian IV. received the title of king (1805), a title afterward confirmed by the treaties of 1814 and 1815. King Maximilian I. was succeeded by his son, Ludwig (or Louis) I., under whom various circumstances helped to quicken a desire for political change. Reform being refused, tumults arose in 1848, and Ludwig resigned in favor of his son, Maximilian II., under whom certain modifications of the constitution were carried out. At his death in 1864 he was succeeded by Ludwig II. In the war of 1866 Bavaria sided with Austria, and was compelled to cede a small portion of its territory to Prussia, and to pay a war indemnity of \$12,500,000. Soon after Bavaria entered into an alliance with Prussia, and in 1867 joined the Zollverein. In the Franco-German war of 1870-71 the Bavarians took a prominent part, and it was at the request of the King of Bavaria, on behalf of all the other princes and the senates of the free cities of Germany, that the King of Prussia agreed to accept the title of Emperor of Germany. Since Jan., 1871, Bavaria has been a part of the German Empire, and is represented in the Bundesrath by six, and in the Reichstag by forty-eight members. The eccentricity early displayed by Ludwig II. developed to such an extent that in June, 1886, he was placed under control, and a regency established under Prince Liutpold (Leopold). The change was almost immediately followed by the suicide of the king, and as Prince Otto, the brother and heir of the late king, was insane, the regency was continued.

**BAY**, in geography, an indentation of some size into the shore of a sea or lake, generally said to be one with a wider entrance than a gulf.

**BAYARD**, Thomas Francis, an American diplomat and statesman, born in Wilmington, Del., 1828, died 1898. He was early engaged in commerce, but later studied law, and began practice in 1851. In 1869 he became U. S. senator, and represented Delaware in the senate until he became secretary of state in Cleveland's first cabinet. He was several times an unsuccessful candidate for nomination to the presidency in democratic national conventions, and was appointed ambassador to England by Cleveland in 1893, serving until 1897. He was given the degree of Doctor of Civil Law by both Oxford and Cambridge Universities.

**BAYARD** (bâ-yâr), Pierre du Terrail, Seigneur de, the Chevalier sans peur et sans reproche (knight without fear and without reproach), born in 1476 in Castle Bayard, near Grenoble, in southern France. At the age of eighteen he accompanied Charles VIII. to Italy, and in the battle at Verona took a standard. When Francis I. ascended the throne he sent Bayard into Dauphiné to open a passage over the Alps and through Piedmont. Prosper Colonna lay in wait for him, but was made prisoner by Bayard, who immediately after further distinguished himself in the battle of Marignano. After his defense of Mézières against the invading army of Charles V. he was saluted in Paris as the savior of his country, receiving the honor paid to a prince of the blood. His presence reduced the revolted Genoese to obedience, but failed to prevent the expulsion of the French after the capture of Lodi. In the retreat the safety of the army was committed to Bayard, who, however, was mortally wounded by a stone from a blunderbuss in protecting the passage of the Sesia. He kissed the cross of his sword, confessed to his squire, and died, April 30, 1524. He was buried in a church of the Minorites, near Grenoble.

**BAY CITY**, a city in Michigan on the e. side of Saginaw river, near its mouth in Saginaw Bay, Lake Huron. Chief articles of trade, lumber and salt. Pop. 30,000.

**BAYEUX TAPESTRY**, so called because it was originally found in the cathedral of Bayeux, in the public library of which town it is still preserved. It is supposed to have been worked by Matilda, queen of William the Conqueror, and to have been presented by Odo, bishop of Bayeux, the half-brother of William, to the church in which it was found. It is 214 feet in length and 20 inches in breadth, and is divided into seventy-two compartments, the subject of each scene being indicated by a Latin inscription. These scenes give a pictorial history of the invasion and conquest of England by the Normans, beginning with Harold's visit to the Norman court, and ending with his death at Hastings.

**BAYNES** (bânz), Thomas Spencer, LL.D., born at Wellington, Somerset, in 1823, died suddenly in London, 1887. In 1873 he became editor of the ninth edition of the Encyclopædia Britannica.

**BAY'ONET**, a straight, sharp-pointed weapon, generally triangular, intended to be fixed upon the muzzle of a rifle or



## BAYONNE CITY

musket, which is thus transformed into a thrusting weapon: probably invented about 1640, in Bayonne. About 1690 the bayonet began to be fastened by means of a socket to the outside of the barrel, instead of being inserted as formerly in the inside. A variety of the bayonet, called the sword-bayonet, is now pretty widely used in European armies, especially for the short rifles of the light infantry, the carbines of the artillery, etc.

German war, when he capitulated at Metz, after a seven weeks' siege, with an army of 175,000 men. For this act he was tried by court-martial in 1871, found guilty of treason, and condemned to death. This sentence was commuted to twenty years' seclusion in the Isle St. Marguerite, from which he escaped and retired to Spain.

**BAZAR'**, or **BAZAAR'**, in the East an exchange, market-place, or place where goods are exposed for sale, usually con-



The coronation of Harold—Men wonder at the star—Harold on the throne.



The battle of Hastings—Portion of the Bayeux tapestry.  
BAYEUX TAPESTRY.

**BAYONNE CITY**, a city in Hudson Co., New Jersey. Pop. 32,722.

**BAYOU** (bā-yō'), in the S. States, a stream which flows from a lake or other stream: frequently used as synonymous with creek or tidal channel.

**BAY RUM**, a spirit obtained by distilling the leaves of *Myrica acris*, or other West Indian trees of the same genus. It is used for toilet purposes, and as a liniment in rheumatic affections.

**BAY-SALT**, a general term for coarse-grained salt, but properly applied to salt obtained by spontaneous or natural evaporation of sea-water in large shallow tanks or bays.

**BAY-WINDOW**, a window forming a recess or bay in a room, projecting outward, and rising from the ground or basement on a plan rectangular, semi-octagonal, or semi-hexagonal, but always straight-sided. The term is, however, also often employed to designate a bow-window, which more properly forms the segment of a circle, and an oriel-window, which is supported on a kind of bracket, and is usually on the first floor.

**BAZAINE** (bā-zān), François Achille, French general, b. 1811, d. 1888. He served in Algeria, in Spain against the Carlists, in the Crimean war, and joined the Mexican expedition as general of division in 1862, and in 1864 was made a marshal of France. He commanded the third army corps in the Franco-

sisting of small shops or stalls in a narrow street or series of streets. These bazar-streets are frequently shaded by a light material laid from roof to roof, and sometimes are arched over. Marts for the sale of miscellaneous articles, chiefly fancy goods, are now to be found



The great bazar, Constantinople.

in most European cities bearing the name of bazars. The term bazar is also applied to a sale of miscellaneous articles, mostly of fancy work, and contributed gratuitously, in furtherance of some charitable or other purpose.

## BEACONSFIELD

**BEACON** (bē'kon), an object visible to some distance, and serving to notify the presence of danger: commonly applied to a fire-signal set on a height to spread the news of hostile invasion or other great event; and also applied to a mark or object of some kind placed conspicuously on a coast or over a rock or shoal at sea for the guidance of vessels, often an iron structure of considerable height.

**BEACONSFIELD**, Benjamin Disraeli, Earl of, an eminent English statesman and novelist, of Jewish extraction; eldest son of Isaac D'Israeli, author of the *Curiosities of Literature*; born in London in 1804, died there in 1881, buried at Hughenden. In 1826 he published *Vivian Grey*, his first novel; and subsequently traveled for some time, visiting Italy, Greece, Turkey, and Syria, and gaining experiences which were afterward reproduced in his books. His travels and impressions are embodied in a volume of letters addressed to his sister and his father. In 1837 he gained an entrance to the House of Commons, being elected for Maidstone. His first speech in the house was treated with ridicule; but he finished with the prophetic declaration that the time



Lord Beaconsfield.

would come when they would hear him. During his first years in parliament he was a supporter of Peel; but when Peel pledged himself to abolish the corn-laws Disraeli became the leader of the protectionists. Having acquired the manor of Hughenden in Buckinghamshire, he was in 1847 elected for this county, and he retained his seat till raised to the peerage nearly thirty years later. His first appointment to office was in 1852, when he became chancellor of the exchequer under Lord Derby. The following year, however, the ministry was defeated. He remained out of office till 1858, when he again became chancellor of the exchequer, and brought in a reform bill which wrecked the government. During the time the Palmerston government was in office Mr. Disraeli led the opposition in the lower house with conspicuous ability and courage. In 1866 the Liberals resigned, and Derby and Disraeli came into power, the latter being again chancellor of the exchequer. They immediately brought in, and carried, after a violent and bitter struggle, a Reform Bill on the basis of household suffrage. In 1868 he became premier on the resignation of Lord Derby, but his tenure of office was short.



In 1874 he again became prime-minister with a strong Conservative majority, and he remained in power for six years. This period was marked by his elevation to the peerage in 1876 as Earl of Beaconsfield, and by the prominent part he took in regard to the Eastern question and the conclusion of the Treaty of Berlin in 1878. In 1880 parliament was rather suddenly dissolved, and, the new parliament showing an overwhelming Liberal majority, he resigned office, though he still retained the leadership of his party. Within a few months of his death the publication of a novel called *Endymion* (his last, *Lothair*, had been published ten years before) showed that his intellect was still vigorous.

**BEAD** (bēd), originally a prayer; then a small perforated ball of gold, pearl, amber, glass, or the like, to be strung on a thread, and used in a rosary by Roman Catholics in numbering their prayers, one bead being passed at the end of each ejaculation or short prayer.

**BEAD-SNAKE**, a beautiful snake of North America, inhabiting cultivated grounds, especially plantations of the sweet-potato, and burrowing in the ground. It is finely marked with yellow, carmine, and black. Though it possesses poison-fangs it never seems to use them.

**BEAGLE** (bē'gl), a small hound, formerly kept to hunt hares, now almost superseded by the harrier, which sometimes is called by its name. The beagle is smaller than the harrier, compactly built, smooth-haired, and with pendulous ears. The smallest of them are little larger than the lap-dog.

**BEAM**, a long straight and strong piece of wood, iron, or steel, especially when holding an important place in some structure, and serving for support or consolidation; often equivalent to girder. In a balance it is the part from the ends of which the scales are suspended. In a loom it is a cylindrical piece of wood on which weavers wind the warp before weaving; also, the cylinder on which the cloth is rolled as it is woven. In a ship one of the strong transverse pieces stretching across from one side to the other to support the decks and retain the sides at their proper distance; hence a ship is said to be "on her beam ends" when lying over on her side.

**BEAN**, a name given to several kinds of leguminous seeds and the plants producing them. The common bean is cultivated both in fields and gardens as food for man and beast. Beans are very nutritious, containing 36 per cent of starch and 23 per cent of nitrogenous matter called legumin, analogous to the casein in cheese. The bean is an annual from 2 to 4 feet high. The flowers are beautiful and fragrant. The kidney-bean, French bean, or haricot is a well-known culinary vegetable. There are two principal varieties, annual dwarfs and runners. The scarlet-runner bean, a native of Mexico, is cultivated on account of its long rough pods and its scarlet flowers.

**BEAR**, the name of several large carnivorous mammals. The teeth are forty-two in number, as in the dog, but there is no carnassial or sectorial tooth, and the molars have a more tubercular

character than in other carnivores. The eyes have a nictitating membrane, the nose is prominent and mobile, and the tail very short. The true bears are about ten in number, natives chiefly of Europe, Asia, and N. America. They generally lie dormant in their den during



Brown bear.

the winter months. The brown or black bear is a native of almost all the northern parts of Europe and Asia, and was at one time common in the British islands. It feeds on fruits, roots, honey, ants, and, in case of need, on mammals. It sometimes reaches the length of 7 feet, the largest speci-



Grizzly bear.

mens being found farthest to the north. It lives solitarily. The American black bear, with black shining hair, is rarely above 5 feet in length. It is a great climber, is less dangerous than the brown bear, and is hunted for its fur and flesh. It is very amusing in captivity. The grizzly bear is an inhabitant of the



Polar bear.

Rocky Mountains; it is a ferocious animal, sometimes 9 feet in length, and has a bulky and unwieldy form, but is nevertheless capable of great rapidity of motion. The extinct cave-bear seems to have been closely akin to the grizzly. The Siberian bear is perhaps

a variety of the brown bear. The polar or white bear is an animal possessed of great strength and fierceness. It lives in the polar regions, frequents the sea, feeds on fish, seals, etc., and usually is 7 to 8 feet in length. The Malayan or coconut palm bear is perhaps the smallest of the bears. It inhabits Cochin-China, Nepaul, the Sunda Islands, etc., lives exclusively on vegetable food, and is an expert climber. It is called also sun-bear and bruang. The Indian black bear or sloth-bear of India and Ceylon is reputed to be a fierce and dangerous animal.

**BEAR**, Great and Little, the popular name of two constellations in the northern hemisphere. The Great Bear (*Ursa Major*) is situated near the pole. It is remarkable for its well-known seven stars, by two of which, called the Pointers, the pole-star is always readily found. The Little Bear (*Ursa Minor*) is the constellation which contains the pole-star. This constellation has seven stars placed together in a manner resembling those in the Great Bear.

**BEAR-BAITING**, the sport of baiting bears with dogs, formerly one of the established amusements, not only of the common people, but of the nobility and even royalty itself. The places where bears were publicly baited were called bear-gardens.

**BEARD**, the hair round the chin, on the cheeks, and the upper lip, which is a distinction of the male sex and of manhood. It differs from the hair on the head by its greater hardness and its form. Some nations have hardly any, others a great profusion. The latter generally consider it as a great ornament; the former pluck it out; as, for instance, the American Indians. The beard has often been considered as a mark of the sage and the priest. Moses forbade the Jews to shave their beards. With the ancient Germans the cutting off another's beard was a high offense. Even now the beard is regarded as a mark of great dignity among many nations in the East, as the Turks. Alexander the Great introduced shaving among the Greeks, by ordering his soldiers to wear no beards; among the Romans it was introduced in B.C. 296. The custom of shaving is said to have come into use in modern times during the reigns of Louis XIII. and XIV. of France, both of whom ascended the throne without a beard. Till then fashion had given divers forms of moustaches and beards. It is only in comparatively recent times that beards and moustaches have again become common.

**BEARD**, George Miller, an American physician, born in Connecticut in 1839. He is known for several works dealing with the nervous system. Died 1883.

**BEARD**, James Henry, an American artist, born at Buffalo in 1814. He painted portraits of Clay, J. Q. Adams, William Henry Harrison, President Taylor, and others, and a number of pictures, among which are *The Long Bill*, *Out All Night*, and *The Land Speculator*. He died in 1893.

**BEARING**, the direction or point of the compass in which an object is seen, or the situation of one object in regard to another, with reference to the points of the compass. Thus, if from a certain



situation an object is seen in the direction of northeast, the bearing of the object is said to be n.e. from the situation.—To take bearings, to ascertain on what point of the compass objects lie.

**BEAR'S-GREASE**, the fat of bears esteemed as of great efficacy in nourishing and promoting the growth of hair. The unguents sold under this name, however, are in a great measure made of hog's lard or veal fat, or a mixture of both, scented and slightly colored.

**BEARDSLEY**, Aubrey, a British artist who gained reputation about 1892 by his fantastic studies in highly contrasted black and white. He was born in 1874 and died in 1898.

**BEAT**, in music, the beating or pulsation resulting from the joint vibrations of two sounds of the same strength, and all but in unison. Also a short shake or transient grace-note struck immediately before the note it is intended to ornament.

**BEATIFICATION**, in the Roman Catholic Church, an act by which the pope declares a person beatified or blessed after his death. It is the first step to canonization, that is, the raising one to the honor and dignity of a saint. No person can be beatified till fifty years after his or her death. All certificates or attestations of virtues and miracles, the necessary qualifications for saintship, are examined by the congregation of Rites. This examination often continues for several years; after which his holiness decrees the beatification, and the corpse and relics of the future saint are exposed to the veneration of all good Christians.

**BEATRICE PORTINARI** (bā-ā-trē'-chā por-tē-nā'rē), the poetical idol of Dante; born about 1266, died 1290; the daughter of a wealthy citizen of Florence, and wife of Simone de Bardi. She was but eight years of age, and Dante nine, when he met her first at the house of her father. He altogether saw her only once or twice, and she probably knew little of him. The story of his love is recounted in the Vita Nuova, which was mostly written after her death.

**BEAUFORT SCALE**, a measure of the velocity of the wind, taking its name from Admiral Beaufort, who introduced it into the British Navy. The following table indicates the value, in miles per hour, of the terms used in the scale:

Designation of Wind.	Approximate Wind Velocity in Miles per Hour.
Calm .....	3 or less
Light air .....	8 "
Light breeze .....	13 "
Gentle " .....	18 "
Moderate " .....	23 "
Fresh " .....	28 "
Strong " .....	34 "
Moderate gale .....	40 "
Fresh " .....	48 "
Strong " .....	56 "
Whole " .....	65 "
Storm " .....	75 "
Hurricane " .....	90 "

**BEAUHARNAIS** (bō-ār-nā), Alexandre, Viscount, was born in 1760 in Martinique. He married Joséphine Tascher de la Pagerie, who was afterward the wife of Napoleon. At the

breaking out of the French revolution he was chosen a member of the National Assembly, of which he was for some time president. In 1792 he was general of the army of the Rhine. He was falsely accused of having promoted the surrender of Mainz, and was sentenced to death July 23, 1794.

**BEAUHARNAIS**, Eugène de, Duke of Leuchtenberg, Prince of Eichstädt, and Viceroy of Italy during the reign of Napoleon, was born 1781, died at Munich 1824. He was the son of Alexandre Beauharnais and Joséphine, afterward wife of Napoleon and Empress of France. He accompanied Napoleon to Egypt in 1798; rose rapidly in the army; was appointed viceroy of Italy in 1805; and married a daughter of the King of Bavaria in 1806. To him and to Ney France was mainly indebted for the preservation of the remains of her army during the retreat from Moscow. After the battle of Lützen of May 2, 1813, where, by surrounding the right wing of the enemy, he decided the fate of the day, he went to Italy, which he defended against the Austrians until the deposition of Napoleon. After the fall of Napoleon he concluded an armistice, by which he delivered Lombardy and all Upper Italy to the Austrians. He then went immediately to Paris, and thence to his father-in-law at Munich, where he afterward resided.—His sister Hortense Eugénie, Queen of Holland, was born in 1783, died in 1837. She became Queen of Holland by marrying Louis Bonaparte, and after Louis's abdication of the throne she lived apart from him. She wrote several excellent songs, and composed some deservedly popular airs. Napoleon III. was her third and youngest son.

**BEAUMARCHAIS** (bō-mār-shā), Pierre Augustin Caron de, a French wit and dramatist, was born at Paris in 1732, died 1799. He early gave striking proofs of his mechanical and also of his musical talents; attained proficiency as a player on the guitar and harp, and was appointed harp-master to the daughters of Louis XV. In the meantime he occupied himself with literature, and published two dramas—Eugénie in 1767 and Les Deux Amis in 1770. He first really distinguished himself by his Mémoires (Paris, 1774), or statements in connection with a lawsuit, which by their wit, satire, and liveliness entertained all France. The Barber of Seville (1775) and the Marriage of Figaro (1784) have given him a permanent reputation.

**BEAUMONT** (bō'mont), Francis, and **FLETCHER**, John, two eminent English dramatic writers, contemporaries of Shakespeare, and the most famous of literary partners. The former was born at Grace-Dieu, in Leicestershire, in 1584; died in 1616, and was buried in Westminster Abbey.—John Fletcher was born at Rye, Sussex, in 1579. He died in London of the plague, August, 1625, and was buried at St. Saviour's, Southwark. The friendship of Beaumont and Fletcher, like their literary partnership, was singularly close; they lived in the same house, and are said to have even had their clothes in common. The works that pass under their names con-

sist of over fifty plays, a masque, and some minor poems. It is believed that all the minor poems except one were written by Beaumont. After the death of Beaumont, Fletcher continued to write plays alone or with other dramatists. It is now difficult, if not indeed impossible, to determine with certainty the respective shares of the two poets in the plays passing under their names.

**BEAUMONT**, William, an American surgeon, born in Connecticut in 1785, died 1853. He was the first to publish the digestive power of the stomach through observations made on the stomach of Alexis St. Martin, an opening into which had been made by a bullet wound which never healed. Beaumont's observations, even yet, are regarded as authoritative.

**BEAUREGARD** (bō'rè-gård), Peter Gustavus Toutant, a general of the Confederate troops in the American civil war; born in 1818 near New Orleans. He studied at the military academy,



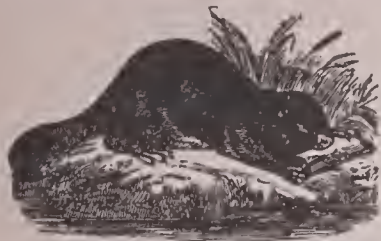
P. G. T. Beauregard.

West Point, and left it as artillery lieutenant in 1838. He served in the Mexican war, and on the outbreak of the civil war joined the Confederates. He commanded at the bombardment of Fort Sumter, gained the battle of Bull Run, lost that of Shiloh, assisted in the defense of Charleston, and aided Lee in that of Richmond. He was regarded as one of the greatest if not the greatest of Confederate generals. He died in 1893.

**BEAVER**, a rodent quadruped, about 2 feet in length exclusive of the tail, at one time common in the northern regions of both hemispheres, but now found in considerable numbers only in North America, living in colonies, but occurring solitary in central Europe and Asia. It has short ears, a blunt nose, small fore-feet, large webbed hind-feet, with a flat ovate tail covered with scales on its upper surface. It is valued for its fur, which used to be largely employed in the manufacture of hats, but for which silk is now for the most part substituted, and for an odoriferous secretion named castor, at one time in high repute, and still largely used in some parts of the world as an anti-spasmodic medicine. The food of the beaver consists of the bark of trees, leaves, roots, and berries. Their favorite haunts are rivers and lakes which are bordered by forests. In winter they live in houses, which are 3 to 4 feet high, arc built on the water's edge, and being substantial



structures with the entrance under water afford them protection from wolves and other wild animals. These dwellings are called beaver "lodges," and accommodate a single family. They also live in burrows. They can gnaw



Beaver.

through large trees with their strong teeth, this being done partly to obtain food, partly to get materials for houses or dam-building. When they find a stream not sufficiently deep for their purpose they throw across it a dam constructed with great ingenuity of wood, stones, and mud.

**BEAVER FALLS**, a town in Beaver Co., Pennsylvania, 31 miles northwest of Pittsburg; on the Beaver river, near its confluence with the Ohio, and on railroads of the Pennsylvania and Erie systems. Pop. 12,000.

**BEBEL**, Ferdinand August, a German socialist, born at Cologne in 1840. In 1867 he, as a turner, joined in the labor agitation, and was one of the founders of the social democratic party in 1869. He was imprisoned (1872) for treason against the Kingdom of Saxony and of lèse majesté against the emperor. Since 1871 he has been a member of the German Reichstag. He has written several widely known works on socialism.

**BECHUANAS, BETCHUANAS** (bech-wan'az), a widely spread race of people inhabiting the central region of South Africa north of Cape Colony. They belong to the great Kaffir stem, and are divided into tribal sections. They live chiefly by husbandry and cattle rearing, and they work with some skill in iron, copper, ivory, and skins. They were led to seek British protection owing to the encroachments of the Boers. The southern portion of their territory was first placed under British protection in 1885, and subsequently the whole Bechuana country up to the Zambesi was annexed. In 1895 the southern portion (then a crown colony) was united to the Cape Colony; the remainder is still a protectorate partly under the rule of native chiefs. The area is about 386,000 sq. miles. Bechuanaland lies between the Transvaal and Matabeleland on the east and the German territory on the west. It is generally speaking flat or only slightly undulating, and is essentially a grass country, all the grasses being of a substantial and nutritious quality which stands well against drought. Surface water is scarce, but there is abundance underground which yet may be turned to account. Some parts are wooded and well watered. Gold, coal, and copper have been found.

**BECK'ET**, Thomas (the form à Beck-et is also common), archbishop of Canterbury, born in London 1117 or 1119, assassinated in Canterbury Cathedral,

29th Dec., 1170. In 1158 Henry II. appointed him high-chancellor and preceptor to his son, Prince Henry—the first instance after the Conquest of a high office being filled by a native Englishman. At this period he was a complete courtier, conforming in every respect to the humor of the king. He was, in fact, the king's prime companion, held splendid levees, and courted popular applause. On the death of Theobald, 1162, he was consecrated archbishop, when he affected an extraordinary austerity of character, and appeared as a zealous champion of the church against the aggressions of the king, whose policy was to have the clergy in subordination to the civil power. Becket was forced to assent to the "Constitutions of Clarendon," but a series of bitter conflicts with the king followed, ending in Becket's flight to France, when he appealed to the pope, by whom he was supported. After much negotiation a sort of reconciliation took place in 1170, and Becket returned to England, resumed his office, and renewed his defiance of the royal authority. A rash hint from the king induced four barons, Reginald Fitz-Urse, William de Tracy, Hugh de Morville, and Richard Breto, to go to Canterbury and murder the archbishop while at vespers in the cathedral. He was canonized in 1172, and the splendid shrine erected at Canterbury for his remains was, for three centuries, a favorite place of pilgrimage.

**BEQUEREL** (bek-rel), Antoine César, French physicist, born 1788, died 1878. He served as an officer of engineers, and retired in 1815, after which he devoted himself to the study of electricity, especially electro-chemistry. He refuted the "theory of contact" by which Volta explained the action of his pile or battery. Becquerel may be considered one of the creators of electro-chemistry.

**BED, BEDSTEAD**, an article of furniture to sleep or rest on. The term bed properly is applied to a large flat bag filled with feathers, down, wool, or other soft material, and also to a mattress supported on spiral springs or form of elastic chains or wirework which is raised from the ground on a bedstead. The term, however, sometimes includes the bedstead or frame for supporting the bed. The forms of beds are necessarily very various—every period and country having its own form of bed. Air-beds and water-beds are much used by invalids.

**BED**, in geol., a layer or stratum, usually a stratum of considerable thickness.

**BEDBUG**. See Bug.

**BED'FORD**, a parl. and municip. borough, England, county town of Bedfordshire, on the Ouse. John Bunyan was born at Elstow, a village near the town, and it was at Bedford that he lived, preached, and was imprisoned. Bedford sends one member to parliament. Pop. 35,144.—Bedfordshire, or Beds, the county, is bounded by Northampton, Bucks, Herts, Cambridge, and Huntingdon; area, 295,509 acres, of which 260,000 are under tillage or in permanent pasture. Chalk hills, forming a portion of the Chilterns, cross it on

the s.; n. of this is a belt of sand. Pop. 171,249.

**BED'LAM**, a corruption of Bethlehem (Hospital), the name of a religious house in London, converted, after the general suppression by Henry VIII., into a hospital for lunatics. The lunatics were at one time treated as little better than wild beasts, and hence Bedlam came to be typical of any scene of wild confusion.

**BEDOUINS** (bed-u-ēnz'), a Mohammedan people of Arab race inhabiting chiefly the deserts of Arabia, Syria, Egypt, and North Africa. They lead a nomadic existence in tents, huts, caverns, and ruins, associating in families under sheiks or in tribes under emirs.



Bedouin Arabs.

In respect of occupation they are only shepherds, herdsmen, and horse-breeders, varying the monotony of pastoral life by raiding on each other and plundering unprotected travelers whom they consider trespassers. They are ignorant of writing and books, their knowledge being purely traditional and mainly genealogical. They are lax in morals, and unreliable even in respect of the code of honor attributed to them in poetry and fiction. In stature they are undersized, and, though active, they are not strong. The ordinary dress of the men is a long shirt girt at the loins, a black or red and yellow handkerchief for the head, and sandals; of the women, loose drawers, a long shirt, and a large dark-blue shawl covering the head and figure. The lance is the favorite weapon.

**BEDSTEAD**. See Bed.

**BEE**, the common name given to a large family of winged insects, of which the most important is the common hive or honey bee. It belongs to the warmer parts of the eastern hemisphere, but is now naturalized in the western. A hive commonly consists of one mother or queen, from 600 to 800 males or drones, and from 15,000 to 20,000 working bees, formerly termed neuters, but now known to be imperfectly-developed females. The last-mentioned, the smallest, have twelve joints to their antennæ, and six abdominal rings, and are provided with a sting; there is, on the outside of the hind-legs, a smooth hollow, edged with hairs, called the basket, in which the kneaded pollen or bee-bread, the food of the larvæ, is stored for transit. The queen has the same characteristics, but is of larger size, especially in the abdomen; she has also a sting. The males, or drones, differ from both the



preceding by having thirteen joints to the antennæ; a rounded head, with larger eyes, elongated and united at the summit; and no stings. According to Huber the working-bees are themselves divisible into two classes: one, the *cirières*, devoted to the collection of provisions, etc.; the other, smaller and more delicate, employed exclusively within the hive in rearing the young. The mouth of the bee is adapted for both masticatory and suctorial purposes, the honey being conveyed thence to the anterior stomach or crop, communicating with a second stomach, in which alone a digestive process can be traced. The queen, whose sole office is to propagate the species, has two large ovaries, consisting of a great number of small cavities, each containing sixteen or seventeen eggs. The inferior half-circles, except the first and last, on the abdomen of working-bees, have each on their inner surface two cavities, where the wax, secreted by the bee from its saccharine food, is formed in layers, and comes out from between the abdominal rings. Respiration takes place by means of air-tubes which branch out to all parts of the body, the bee being exceedingly sensitive to an impure atmosphere. Of the organs of sense the most important are the antennæ, deprivation of these resulting in a species of derangement. The majority of entomologists regard their function as in the first place auditory, but they are exceedingly sensitive to tactual impressions, and are apparently the principal means of mutual communication. Bees undergo perfect metamorphosis, the young appearing first as larvæ, then changing to pupæ, from which the imago or perfect insects spring. Whether the offspring are to be female or male is said to be dependent upon the contact or absence of contact of the egg with the impregnating fluid received from the male and stored in a special sac communicating with the oviduct, unfertilized eggs producing males. The further question whether the offspring shall be queens or workers is resolved by the influence of environment upon function. The enlargement of a cell to the size of a royal chamber and the nourishment of its inmate with a special kind of food appear to be sufficient to transform an ordinary working-bee larva into a fully-developed female or queen-bee. The season of fecundation occurs about the beginning of summer, and the laying begins immediately afterward, and continues until autumn; in the spring as many as 12,000 eggs may be laid in twenty-four days. Those laid at the commencement of fine weather all belong to the working sort, and hatch at the end of four days. The larvæ acquire their perfect state in about twelve days, and the cells are then immediately fitted up for the reception of new eggs. The eggs for producing males are laid two months later, and those for the females immediately afterward. This succession of generations forms so many distinct communities, which, when increased beyond a certain degree, leave the parent hive to found a new colony elsewhere. Thus three or four swarms

sometimes leave a hive in a season. A good swarm is said to weigh at least 6 or 8 pounds. See *Apiary*.

The humble-bees, or bumble-bees, of which about forty species are found in Britain and over sixty in N. America, are almost world-wide in their distribution. Of these species solitary females which have survived the winter commence constructing small nests when the weather begins to be warm enough; some of them going deep into the earth in dry banks, others preferring heaps of stone or gravel, and others choosing always some bed of dry moss. In the nest the bee collects a mass of pollen and in this lays some eggs. The cells in these nests are not the work of the old bee, but are formed by the young insects similarly to the cocoons of silkworms; and when the perfect insect is released from them by the old bee, which gnaws off their tops, they are employed as honey-cups. The humble-bees, however, do not store honey for the winter, those which survive till the cold weather leaving the nest and penetrating the earth, or taking up some other sheltered position, and remaining there till the spring. The first brood consists of workers, and successive broods are produced during the summer.

**BEECH**, the common name of trees well known in various parts of the world. The wood is hard and brittle, and if exposed to the air liable soon to decay. It is, however, peculiarly useful to cabinet-makers and turners, carpenters' planes, furniture, sabots, etc., being made of it; and it is durable under water for piles and mill-slucies.

**BEECHER** (bē'chēr), Henry Ward, an eminent American preacher, born in Connecticut 1813; was minister at Lawrenceburg, Ind., 1837, and of Plymouth Congregational Church, Brook-



Henry Ward Beecher.

lyn, New York, in 1847. The latter pulpit he continued to occupy till his death in 1887, though in 1882 he ceased his formal connection with the Congregationalists on the ground of disbelief in eternal punishment. From 1861 to 1863 he was editor of the *Independent*, and for about ten years after 1870, of the *Christian Union*. He was also the author of a considerable number of works, of which his *Lectures to Young Men* (1850), *Life Thoughts* (1858), *Lectures on Preaching* (1872-74), and the weekly issues of his sermons, commanded wide circulation. Few contemporary preachers appealed to as large and diverse a public. His brothers Charles, Edward, and Thomas have all distinguished themselves as Congre-

gational clergymen. His sister Catherine Esther (born 1800, died 1878) did much for the education of women, and wrote on this subject and on domestic economy and kindred subjects. Another sister is still better known as Mrs. Beecher-Stowe. See *Stowe*.

**BEEFSTEAK CLUBS**, certain noted clubs of London in the 18th century, particularly the Sublime Society of Steaks, founded in 1735, to which belonged Thornhill, Hogarth, Garrick, and other celebrities of the day. There is a Beefsteak Club at present in London. The New York Beefsteak Club and the Gridiron Club of Washington were founded by newspaper and periodical writers.

**BEEF TEA**, a drink made from an extract of beef, formerly believed to be quite nutritious but no longer considered so. It is made by placing chopped lean beef in a mason jar, closing the same, and placing the jar in cold water which is brought to boiling and kept there until the meat is reduced to liquid. Beef tea is sometimes made from solid beef extracts, but its food value is problematical.

**BEE-KEEPING**, the art of having honey bees and securing the honey. The bee hive to be successful should be located in a place near to flowers or clover; glass, wood, and straw are good materials for the hive; facilities for increasing the space should be regarded; care should be taken that the swarm should not roam away and be lost; twenty pounds of honey should be left in the hive for the winter food of the bees, although ale boiled with sugar is a good substitute. In removing the honey gloves and veils should be worn as protection from the insects' stings.

**BEER MONEY**. A peculiar payment to non-commissioned officers and soldiers in the British Army, established in the year 1800, at the suggestion of the Duke of York. It consisted of one penny per day for troops when on home service, as a substitute for an issue of beer and spirits. It continued as an addition to the daily pay until 1873, when, the stoppages for rations having been abolished, the opportunity was taken to consolidate beer money and pay proper.

**BEELZEBUB** (bē-el'zē-bub), the supreme god of the Syro-Phœnician peoples, in whose honor the Philistines had a temple at Ekron. With his name may be compared the epithet "averted of flies" applied to Zeus and later to Hercules. The use of Beelzebub in the New Testament has been the subject of much discussion, some asserting it to be an opprobrious form of Beelzebub, meaning the "lord of dung," others translating it "lord of the dwelling," and others again finding in the change from b to l only a natural linguistic modification.

**BEER**. See *Ale and Brewing*.

**BEERSHE'BA**, the place where Abraham made a covenant with Abimelech, and in common speech representative of the southernmost limit of Palestine, near which it is situated. It is now a mere heap of ruins near two large and five smaller wells, though it was a place of some importance down to the period of the Crusades.



**BEESWAX**, a solid fatty substance secreted by bees, and containing in its purified state three chemical principles—myricin, cerin, and cerolein. It is not collected from plants, but elaborated from saccharine food in the body of the bee. It is used for the manufacture of candles, for modeling, and in many minor processes.

**BEET**, a genus of plants, distinguished by its fruit being inclosed in a tough woody or spongy five-lobed enlarged calyx. Two species only are known in general cultivation, namely, the sea-beet and the garden beet. The former is a tough-rooted perennial, sometimes cultivated for its leaves, which are an excellent substitute for spinach. Of the garden beet, which differs from the last in being of only biennial duration and in forming a tender fleshy root, two principal forms are known to cultivators, the chard beet and the common beet. In the chard beet the roots are small, white, and rather tough, and the leaves are furnished with a broad, fleshy midrib, employed as a vegetable by the French, who dress the ribs like sea-kale under the name of *poirée*. The common beet includes all the fleshy-rooted varieties, such as red beet (with a fleshy large carrot-shaped root), yellow beet, sugar-beet, mangel-wurzel, etc. For garden purposes the best is the red beet. The beet requires a rich light soil. Red beet is principally used at table, but if eaten in great quantity is said to be injurious. The beet may be taken out of the ground for use about the end of August, but it does not attain its full size and perfection till the month of October.

**BEET SUGAR**. See Sugar.

**BEETHOVEN** (bā'tō-vn), Ludwig von, a great German musical composer, born at Bonn, 16th Dec., 1770, studied under his father (a tenor singer), Pfeiffer, Van der Eden, and Neefe;



Ludwig von Beethoven.

began to publish in 1783; became assistant court organist in 1785; and was sent by the Elector of Cologne to Vienna in 1792, where he was the pupil of Haydn and Albrechtsberger, and acquired a high reputation for pianoforte extemporization before the merit of his written compositions was fully understood. In or near Vienna almost all his subsequent life was spent, his artistic tour in North Germany in 1796 being the most important break. He died March 27, 1827. His later life was rendered somewhat morbid by his deafness, of which the first signs appeared

in 1797. He had the head of Jove on the body of Bacchus, and there was in him a strong dash of what in a lesser man would be termed insanity, with an alternation between the highest elevation of genius and the conduct of a fool or buffoon. His best works were published after 1800, two periods being observable: the first from 1800 to 1814, comprising Symphonies 2-8; the opera *Fidelio* (originally *Leonore*), the music to Goethe's *Egmont*, and the overtures to *Prometheus*, *Coriolanus*, *King Stephen* and *Fidelio*; the second (in which the poetic school of musicians find the germs of the subsequent development through Schumann, Wagner, and Liszt) comprising the 9th Symphony, the *Missa Solemnis*, and the *Sonatas Op. 101, 102, 106, 109, 110, and 111*.

**BEETLE**, a name often used as synonymous with the term *Coleoptera*, but restricted by others to include all those insects that have their wings protected by hard cases or sheaths, called *elytra*. Beetles vary in size from a mere point to the bulk of a man's fist, the largest, the elephant beetle of S. America, being 4 inches long. The so-called "black beetles" of kitchens and cellars are not properly beetles at all, but cockroaches, and of the order *Orthoptera*.

**BEETLE-STONE**, a nodule of coprolitic ironstone, so named from the resemblance of the inclosed coprolite to the body and limb of a beetle.

**BEET-ROOT**. See Beet.

**BEGGARS**. See Vagrants.

**BEGO'NIA**, an extensive genus of succulent-stemmed herbaceous plants, order *Begoniaceæ*, with fleshy oblique leaves of various colors, and showy unisexual flowers, the whole perianth colored. They readily hybridize, and many fine varieties have been raised from the tuberous-rooted kinds. From the shape of their leaves they have been called elephant's ear. Almost all the plants of the order are tropical, and they have mostly pink or red flowers.

**BEHAR'**, a province of Hindustan, in Bengal, area 44,139 sq. miles. It is the most densely peopled province of India; pop. 24,284,370. Patna is the capital.

**BEHEADING**. See Capital Punishment.

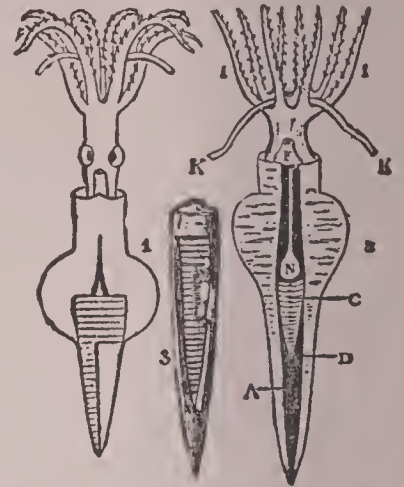
**BEHE'MOTH**, the animal described in Job xl. The description is most applicable to the hippopotamus, and the word seems to be of Egyptian origin and to signify "water-ox"; but it has been variously asserted to be the ox, the elephant, the crocodile, etc.

**BEH'RING**. See Bering.

**BELASCO**, David, an American manager and playwright, born in San Francisco in 1862. He began his career as a player and began writing soon thereafter, his first successful venture being *Hearts of Oak*. While manager of the Lyceum Theater, New York, he wrote (with Henry C. De Mille) *The Wife*, *The Charity Ball*, and *Lord Chumley*. Other plays to which he has contributed are *The Girl I Left Behind Me*, *The Heart of Maryland*, *Zaza*, *May Blossom*, *Men and Women*, *La Belle Russe*, *Valérie*, and *Du Barry*.

**BEL'EMNITE**, a name for straight, solid, tapering, dart-shaped fossils,

popularly known as arrow-heads, thunderbolts, finger-stones, etc., but in reality the internal shell or skeleton of a molluscous animal allied to the squid or sepia, and the type of an extinct family, *Belemnitidæ*.



Belemnites.

1. *Belemniteuthis antiquæ*—ventral side.
2. *Belemnites Oweni* (restored). A. Guard. C. Phragmacone. D. Muscular tissue of mantle. E. Infundibulum. I. Uncinated arms. K. Tentacula. N. Ink-bag.
3. *Belemnite*—British Museum.

**BELFAST'**, a seaport and municipal and parliamentary borough of Ireland (in 1888 declared a city), principal town of Ulster, and county town of Antrim. Belfast is the center of the Irish linen trade, and has the majority of spinning-mills and power-loom factories in Ireland. Previous to about 1830 the cotton manufacture was the leading industry of Belfast, but nearly all the mills have been converted to flax-spinning. The iron ship-building trade is also of importance, and there are breweries, distilleries, flour-mills, oil-mills, foundries, print-works, tan-yards, chemical works, rope-works, etc. The commerce is large. An extensive direct trade is carried on with British North America, the Mediterranean, France, Belgium, Holland, and the Baltic, besides the regular traffic with the principal ports of the British islands. Belfast is comparatively a modern town, its prosperity dating from the introduction of the cotton trade in 1777. It has suffered severely at various times from faction-fights between Catholics and Protestants, the more serious having been in the years 1864, 1872, and 1886. It returns four members to the Imperial Parliament. Pop. 348,965.

**BELFORT**, a small fortified town and territory of France. Belfort, with the district immediately surrounding it, is the only part of the department of Haut Rhin which remained to France on the cession of Alsace to Germany. Pop. of territory, 91,765.

**BEL'FRY**, a bell-tower or bell-turret. A bell-tower may be attached to another building, or may stand apart; a bell-turret usually rises above the roof of a building, and is often placed above the top of the western gable of a church. The part of a tower containing a bell or bells is also called a belfry.

**BELGAUM** (bel-gā'um), a town and fortress in Hindustan, Bombay Presidency, district of Belgaum, on a plain



2500 feet above the sea-level. In 1818 the fort and town were taken by the British, and from its healthful situation selected as a permanent military station. Pop. of town (including the cantonment), 36,878. The area of the district is 4657 sq. miles, with a population of 1,013,261.

**BELGIUM** (bel'jum), a European kingdom, bounded by Holland, the North Sea or German Ocean, France, and Germany; greatest length, 165 miles; greatest breadth, 120 miles; area, 11,366 sq. miles. For administrative purposes it is divided into nine provinces—Antwerp, Brabant, East Flanders, West Flanders, Hainaut, Liège, Limburg, Luxemburg, and Namur; total pop. 6,815,054. Brabant, the metropolitan province, occupies the center. The capital is Brussels; other chief towns are Antwerp, Ghent, and Liège. The country may be regarded roughly as an inclined plain, falling away in height from the southern district of the Ardennes until in the n. and w. it becomes only a few feet above sea-level.

The industrial products of Belgium are very numerous, and are mostly of high character. The chief are those connected with linen, wool, cotton, metal, and leather goods. In respect of manufactures the fine linens of Flanders, and lace of South Brabant, are of European reputation. Scarcely less celebrated are the carpets and porcelain of Tournay, the cloth of Verviers, the extensive foundries, machine-works, and other iron establishments of Liège. The commerce of Belgium is large and increasing. Apart from the value of her own products, she is admirably situated for the transit trade of central Europe, to which her fine harbor of Antwerp and excellent railway and canal system minister.

The Belgian population is the densest of any European state (539 per square mile), and is composed of two distinct races—Flemish, who are of German, and Walloons, who are of French extraction. The former, by far the more numerous, have their principal locality in Flanders; but also prevail throughout Antwerp, Limburg, and part of South Brabant. The latter are found chiefly in Hainaut, Liège, Namur, and part of Luxemburg. The Flemings speak a dialect of German, and the Walloons a corruption of French, with a considerable infusion of words and phrases from Spanish and other languages. French is the official and literary language, though Flemish is also successfully employed in literature. Almost the entire population is Roman Catholic, and there are over 1500 convents, with nearly 25,000 inmates. Protestantism is fully tolerated, but cannot count more than 15,000 adherents. Improved means of education are now at the disposal of the people, every commune being bound to maintain at least one school for elementary education, the government paying one-sixth, the province one-sixth, and the commune the remainder of the expenditure. In all the large towns colleges have been established; while a complete course for the learned professions is provided by four

universities, two of them, at Ghent and Liège, established and supported by the state; one at Brussels, the Free University, founded by voluntary association; and one at Louvain, the Catholic University, founded by the clergy.

By the Belgian constitution the executive power is vested in a hereditary king; the legislative, in the king and two chambers—the senate and the chamber of representatives—the former elected for eight years, and the latter for four, but one-half renewable respectively every four years and every two years. There is now a system of proportional representation both for the senate and the chamber. Representatives are elected on the principle of manhood suffrage, but certain property or educational qualifications may give a voter three votes. The senators are partly elected directly, partly indirectly by provincial councils. Senators must be forty years of age, deputies and electors twenty-five. The army is raised partly by enlistment, partly by the ballot, to which every man who has completed his nineteenth year is liable. The peace strength is about 51,500 officers and men; in time of war, 163,000. Besides this standing army, there is a garde civique numbering 40,000 partly active, partly non-active men. The navy is confined to a few steamers and a small flotilla of gun-boats.

The territory now known as Belgium originally formed only a section of that known to Cæsar as the territory of the Belgæ, extending from the right bank of the Seine to the left bank of the Rhine, and to the ocean. This district continued under Roman sway till the decline of the empire; subsequently formed part of the kingdom of Clovis; and then of that of Charlemagne, whose ancestors belonged to Landen and Herstal on the confines of the Ardennes. After the breaking up of the empire of Charlemagne Belgium formed part of the kingdom of Lotharingia under Charlemagne's grandson, Lothaire; Artois and Flanders, however, belonging to France by the treaty of Verdun.

For centuries this kingdom was contended for by the kings of France and the emperors of Germany. In 1384 Flanders and Artois fell to the house of Burgundy, which in less than a century acquired the whole of the Netherlands.

The Seven Years' War (1756-63) did not affect Belgium, and in that period, and during the peace which followed, she regained much of her prosperity under Maria Theresa and Charles of Lorraine.

In 1815 Belgium was united by the Congress of Vienna to Holland, both countries together now forming one state, the Kingdom of the Netherlands. This union lasted till 1830, when a revolt broke out among the Belgians, and soon attained such dimensions that the Dutch troops were unable to repress it. A convention of the great powers, assembled in London, favored the separation of the two countries, and drew up a treaty to regulate it; the National Congress of Belgium offering the crown, on the recommendation of England, to Leopold, prince of Saxe-Coburg, who acceded to it under the title of Leopold

I., on July 21, 1831. Leopold II. succeeded his father in 1865. In recent years the chief feature of Belgian politics has been a keen struggle between the clerical and the liberal party. In 1893 a bill giving an extension of the franchise was passed. Recent years have been marked by socialistic movements and labor troubles.

**BELGRADE** (bel-grād'), capital of Servia, on the right bank of the Danube in the angle formed by the junction of the Save with that river, consists of the citadel or upper town, on a rock 100 feet high; and the lower town, which partly surrounds it. Being the key of Hungary, it was long an object of fierce contention between the Austrians and the Turks, remaining, however, for the most part in the hands of the Turks until its evacuation by them in 1867. Since the treaty of Berlin (July, 1878) it has been the capital of an independent state. Pop. 69,097.

**BE'LIAL**, a word which by the translators of the English Bible is often treated as a proper name, as in the expressions 'son of Belial,' 'man of Belial.' In the Old Testament, however, it ought not to be taken as a proper name, but it should be translated "wickedness" or "worthlessness." To the later Jews Belial seems to have become what Pluto was to the Greeks, the name of the ruler of the infernal regions; and in 2 Cor. vi. 15 it seems to be used as a name of Satan, as the personification of all that is bad.

**BELISARIUS** (Slavonic, Beli-tzar, White Prince), the general to whom the Emperor Justinian chiefly owed the splendor of his reign; born in Illyria about 505 A.D. He served in the body-guard of the emperor, soon after obtained the chief command of an army on the Persian frontiers, and in 530 gained a victory over a superior Persian army. The next year, however, he lost a battle, and was recalled. In the year 532 he checked the disorders in Constantinople arising from the Green and Blue factions; and was then sent with 15,000 men to Africa to recover the territories occupied by the Vandals. He took Carthage and led Gelimer, the Vandal king, in triumph through Constantinople. Dissensions having arisen in the Ostrogothic kingdom, he was sent to Italy, and though ill supplied with money and troops, stormed Naples, held Rome for a year, took Ravenna, and led captive Vitiges, the Gothic king. He died in 555.

**BELL**, a hollow, somewhat cup-shaped sounding-instrument of metal. The metal from which bells are usually made (by founding) is an alloy, called bell-metal, commonly composed of eighty parts of copper and twenty of tin. The proportion of tin varies, however, from one-third to one-fifth of the weight of the copper, according to the sound required, the size of the bell, and the impulse to be given. The clearness and richness of the tone depend upon the metal used, the perfection of its casting, and also upon its shape; it having been shown by a number of experiments that the well-known shape with a thick lip is the best adapted to give a perfect sound. The depth of



trio of popes, and the emperor, Henry III., to put an end to the scandal, deposed all the three. He died in 1054.—Benedict XIII., a learned and well-disposed man, originally Cardinal Orsini and Archbishop of Benevento, became

efficacy in epidemics. Made in the same way since 1510.

**BENEDICTINES**, members of the most famous and widely-spread of all the orders of monks, founded at Monte Casino, about half-way between Rome

sleeves, and a cowl on the head ending in a point. The Benedictines have produced many valuable literary works. The fraternity of St. Maur, founded in 1618, had in the beginning of the 18th century 180 abbeys and priories in France, and acquired by means of its learned members, such as Mabillon, Montfaucon, and Martène, merited distinction. They published the celebrated chronological work *L'Art de Verifier les Dates*, and edited many ancient authors.

**BENEDICT'ION**, the ceremony of calling a divine blessing upon an individual, a thing, a place, a community, or an undertaking. Invoking a blessing is one of the oldest of customs, and has been practiced by pagans as well as Christians. The pontifical blessing is a special benediction given by the pope of Rome.

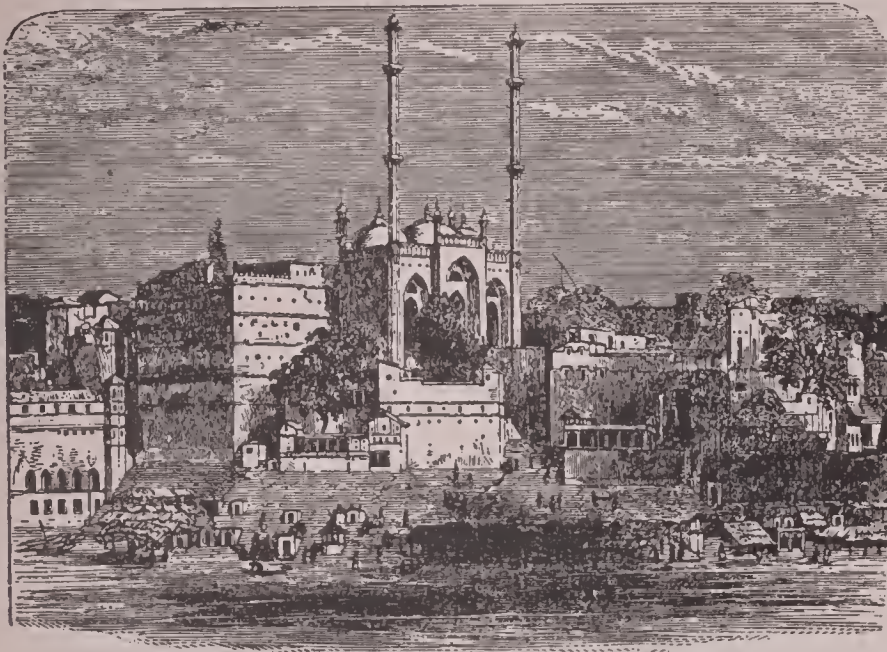
**BENEFIT SOCIETIES**, organizations for the purpose of securing a cheap, mutual life insurance, to pay funeral expenses, to provide for old age, or other beneficent end. Many labor unions have benefit funds which are applied to members during illness or other specified incapacity. These organizations are more numerous in the United States than elsewhere, and are regarded as an evidence of prosperity.

**BENEVENTO**, a city of southern Italy, the see of an archbishop, in a province of same name, on a hill between the rivers Sabato and Calore, occupying the site of the ancient Beneventum, and largely built of its ruins. Few cities have so many remains of antiquity, the most perfect being a magnificent triumphal arch of Trajan, built in 114. The cathedral is a building of the 12th century in the Lombard-Saracenic style. Pop. 21,631.—The province has an area of 680 sq. miles, and a pop. of 238,425.

**BENEVOLENCES**, a means of raising money by forced loans or contributions, first adopted by Edward IV., and employed frequently down to the time of James I.

**BENGAL** (ben-gal'), a name formerly given to one of the three "presidencies" of British India which included the whole of British India except what was under the governors of Madras and Bombay. Latterly in this sense the term had no administrative meaning except as regards the army. By Bengal is now usually understood the Lieutenant-governorship of Bengal, the most important of the local governments of British India. It comprises the united deltas of the Ganges and Brahmaputra, and stretches north to Nepaul and Sikkim, west to the United Provinces, east to Assam, and south to the Bay of Bengal. The divisions of which it is made up are the Presidency (Calcutta, etc.), Dacca, Chittagong, Rajeshahye, Bhaugulpore, Patna, Burdwan, Chota Nagpur, and Orissa; total area, 151,185 sq. miles; pop. 74,744,866. The feudatory states connected with it have an aggregate area of 38,652 sq. miles, and a pop. of 3,748,544.

As a whole Bengal consists of plains, there being few remarkable elevations, though it is surrounded with lofty mountains. It is intersected in all di-



Benares, from the river.

pope in 1724. He bestowed his confidence on Cardinal Coscia, who was unworthy of it, and abused it in gratifying his avarice. He died in 1730, and was succeeded by Clement XII.—Benedict XIV., Prospero Lambertini, born at Bologna in 1675, died 1758, a man of superior talents, passionately fond of learning, of historical researches, and monuments of art. Benedict XIII. made him, in 1727, bishop of Ancona; in 1728 cardinal; and in 1732 archbishop of Bologna. In every station he fulfilled his duties with the most conscientious zeal. He succeeded Clement XII. in 1740, and showed himself a liberal patron of literature and science. He was the author of several esteemed religious works.

**BENEDICT**, St., the founder of the first religious order in the West; born at Nursia, in the province of Umbria, Italy, A.D. 480, died 543. In early youth he renounced the world and passed some years in solitude, acquiring a great reputation for sanctity. His *Regula Monachorum*, in which he aimed, among other things, at repressing the irregular lives of the wandering monks, gradually became the rule of all the western monks. Under his rule the monks, in addition to the work of God (as he called prayer and the reading of religious writings), were employed in manual labor, in the instruction of the young, and in copying manuscripts, thus preserving many literary remains of antiquity. See Benedictines.

**BENEDICT'INE**, a liquor prepared by the Benedictine monks of the abbey of Fécamp, in Normandy, consisting of spirit (fine brandy) containing an infusion of the juices of plants, and said to possess digestive, antispasmodic, and other virtues, and to have prophylactic

and Naples, in 529, by St. Benedict. No religious order has been so remarkable for extent, wealth, and men of note and learning as the Benedictines. Among the branches of the order the chief were the Cluniacs, founded in 910 at Clugny in Burgundy; the Cistercians, founded in 1098, and reformed by St.



Benedictine monk.

Bernard in 116; and the Carthusians from the Chartreuse, founded by Bruno about 1080. The order was probably introduced into England about 600 by St. Augustine of Canterbury, and a great many abbeys, and all the cathedral priories of England, save Carlisle, belonged to it. In Britain the Benedictines were called Blackfriars, from the color of their habit, which consisted of a loose black gown with large wide



rections by rivers, mostly tributaries of its two great rivers the Ganges and Brahmaputra, which annually, in June and July, inundate a large part of the region. These annual inundations render the soil extremely fertile, but in those tracts where this advantage is not enjoyed the soil is thin, seldom exceeding a few inches in depth.

The climate is variable, the heat being often extreme and great humidity prevailing. The seasons are called hot (March to June), rainy (June to October), and cold (the remainder of the year). In eastern Bengal there is an annual fall of 100 inches of rain. Products are rice, fruits, indigo, opium, sugar, tobacco, cotton, jute, tea, and cinchona. Forests abound. Wild animals of numerous variety are found in them. The minerals are iron, coal, and salt. Manufactures, cotton piece goods, jute, and silk. The people of Bengal are principally Hindus and Burmese. Hinduism and Mohammedanism are the religions.

The first of the East India Company's settlements in Bengal were made early in the 17th century. The rise of Calcutta dates from the end of the same century. The greater part of Bengal came into the hands of the East India Company in consequence of Clive's victory at Plassy in 1757, and was formerly ceded to the Company by the Nabob of Bengal in 1765. Chittagong had previously been ceded by the same prince, but its government under British administration was not organized till 1824. Orissa came into British hands in 1803. In 1858 the country passed to the crown, and since then the history of Bengal has been, on the whole, one of steady and peaceful progress.

**BENGAL, BAY OF**, that portion of the Indian Ocean which lies between Hindustan and Farther India, or Burmah, Siam, and Malacca, and may be regarded as extending south to Ceylon and Sumatra. It receives the Ganges, Brahmaputra, and Irrawadi. Calcutta, Rangoon, and Madras are the most important towns on or near its coasts.

**BENGA'LI**, one of the vernacular languages of India, spoken by about 50,000,000 people in Bengal, akin to Sanskrit and written in characters that are evidently modified from the Devanāgarī (Sanskrit). Its use as a literary language began in the 14th century with poetry. Large numbers of Bengali books are now published, as also newspapers. A large number of words are borrowed from Sanskrit literature.

**BENGUELA** (ben-gā'lā), a district belonging to the Portuguese on the w. coast of South Africa; area, perhaps 150,000 sq. miles. The country is mountainous in the interior, and thickly intersected by rivers and streams. Its vegetation is luxuriant, including every description of tropical produce, and animal life is equally abundant. Copper, silver, iron, salt, sulphur, petroleum, and other minerals are found. The natives are mostly rude and barbarous. Pop. estimated at 2,000,000.

**BENJAMIN**, Judah Philip, an American statesman, born in the West Indies in 1811, died 1884. He was educated at Yale, was, in 1840, a member of the

law firm of Slidell, Benjamin, and Conrad, at New Orleans. He became famous for his ability as a lawyer, and declined a seat on the United States Supreme bench. From 1852 to 1861 he was United States senator from New Orleans, but in the latter year resigned to join with the confederacy, becoming attorney-general, secretary of war, and secretary of state in President Davis's cabinet. After the war he fled to England and was called to the English bar in 1866, and soon acquired a great reputation and a very large practice. He was known as "the brains of the Confederacy."

**BENJAMIN**, Park, an American lawyer and authority on patents. He was born in New York in 1849, entered the navy, resigned in 1869, studied law, and was associate editor of *The Scientific American* from 1872 to 1878. Since that time he has practiced law and written numerous sketches and books on scientific and pseudo-scientific subjects.

**BEN'NETT**, James Gordon, an American journalist, born in Banffshire, Scotland, 1795, and educated at Aberdeen. He emigrated to Halifax, Nova Scotia, in 1819 as a teacher, and went thence to Boston as a proof-reader. In 1822 he went to New York, and, after being connected with various papers, started the *New York Herald* in 1835. By his enterprise and not very scrupulous conduct of the journal it speedily became an enormous success, its yearly profit at his death being estimated at from a half to three-quarters of a million dollars. It was the first paper which published a daily money article and stock lists. The expedition of Stanley to Africa in 1871 in search of Livingstone was projected and supported by Bennett, who, however, died in the following year.

**BENT**, Silas, an American naval officer, born at St. Louis in 1820, died in 1889. He entered the navy in 1836 and served 25 years as hydrographer and meteorologist. He took part in the Seminole war and was captain under Commodore Perry in Japanese waters. He was the first to describe the Pacific stream.

**BENTHAM** (ben'tham), Jeremy, a distinguished writer on politics and jurisprudence, born at London in 1749; educated at Westminster and Oxford; entered Lincoln's Inn 1763. He was called to the bar, but did not practice, and, having private means, devoted himself to the reform of civil and criminal legislation. A criticism on a passage in Blackstone's Commentaries, published under the title *A Fragment on Government*, 1776, brought him into notice; and it was followed by a long list of works, of which the more important were: *The Hard Labour Bill*, 1778; *Principles of Morals and Legislation*, 1780; *A Defence of Usury*, 1787; *Introduction to the Principles of Morals and Legislation*, 1789; *Discourses on Civil and Penal Legislation*, 1802; *Treatise on Judicial Evidence*, 1813; *Paper relative to Codification and Public Instruction*, 1817; and *the Book of Fallacies*, 1824. His mind, though at once subtle and comprehensive, was characterized by something of the Coleridge-

ean defect in respect of method and sense of proportion; and he is, therefore, seen at his best in works that underwent revision at the hands of his disciples. Of these M. Dumont, by his excellent French translations and rearrangements, secured for Bentham at an early date a European reputation and influence, and his editions are still the most satisfactory. In England James Mill, Romilly, John Stuart Mill, Burton, and others of independent genius, have been among his exponents. In ethics he must be regarded as the founder of modern utilitarianism; in polity and criminal law he anticipated or suggested many practical reforms; and his whole influence was stimulating and humanizing.

**BENTLEY**, Richard, an English classical scholar and critic, born 1662, died 1742. He was noted as a controversialist, and his *Dissertation on the Epistles of Phalaris* is a great classic in controversial style.

**BENTON**, James Gilchrist, an American inventor and soldier, born in New Hampshire in 1820, died 1881. He graduated from West Point and entered the army in 1842. In 1853 he perfected a gun-carriage for seacoast service, and during the civil war had charge of arsenals. He invented many devices for the perfection of firearms, the Springfield rifle being chiefly of his invention.

**BENTON**, Thomas Hart, an American statesman, author of *Thirty Years' View* (of the United States senate). He was born in North Carolina in 1782, and in 1815 settled at St. Louis and established *The Missouri Inquirer*. He fought several duels, killing one man, and in 1820 was chosen United States senator. He opposed the United States Bank, favored election of the President by direct popular vote, and generally allied himself with the West. Senator Benton was an advocate of abolition. He died in 1858.

**BEN'ZINE**, a liquid hydrocarbon obtained from coal-tar and petroleum. It may also be got by distilling 1 part of crystallized benzoic acid intimately mixed with 3 parts of slaked lime. It is quite colorless, of a peculiar, ethereal, agreeable odor, is used by manufacturers of india-rubber and gutta-percha, on account of its great solvent powers, in the preparation of varnishes, and for cleaning gloves, removing grease-spots from woolen and other cloths, etc., on account of its dissolving fats and resins. It is highly inflammable.

**BENZO'IC ACID**, a vegetable acid obtained from benzoin and other resins and balsams, as those of Peru and Tolu. It forms light feathery needles; taste pungent and bitterish; odor slightly aromatic.

**BENZOIC ETHER**, a colorless oily liquid, with a feeble aromatic smell and a pungent aromatic taste, obtained by distilling together 4 parts alcohol, 2 of crystallized benzoic acid, and 1 of concentrated hydrochloric acid.

**BEN'ZOIN** ("Javanese incense"), a solid, brittle, vegetable substance, the concrete resinous juice flowing from incisions in the stem or branches of a tree 70 or 80 feet high. In commerce several varieties are distinguished, of which the yel-



low, the Siam, the amygdaloidal—the last containing whitish tears of an almond shape—and Sumatra firsts are the finest. It is imported from Siam, Singapore, Bombay, and occasionally from



Benzoin tree.

Calcutta; it is found also in South America. The pure benzoin consists of two principal substances, viz., a resin, and an acid termed benzoic. It has little taste, but its smell is fragrant when rubbed or heated, and it is used as incense in the Greek and Roman Catholic Churches. It is insoluble in water, but soluble in alcohol, in which form it is used as a cosmetic and in pharmacy. Benzoin may be produced by the contact of alkalies with the commercial oil of bitter almonds. It is also known as benjamin, or gum benjamin.

**BERANGER** (bā-rān-zhā), Pierre Jean de, French lyric poet, born in Paris 19th August, 1780. Reduced to extremity, he applied in 1804 to Lucien Bonaparte for assistance, and succeeded in obtaining from him, first, a pension of 1000 francs, and five years later a university clerkship. Although as yet unprinted, many of his songs had become extremely popular, and in 1815 the first collection of them was published. A second collection, published in 1821, made him obnoxious to the Bourbon government, and in addition to being dismissed from his office in the university he was



Béranger.

sentenced to three months' imprisonment and a fine of 500 francs. A third collection appeared in 1825, and in 1828 a fourth, which subjected him to a second state prosecution, an imprisonment of nine months, and a fine of 10,000 francs. In 1833 he published his fifth and last collection, thereafter remaining silent till his death. Shortly after the revolution of February, 1848, he was elected representative of the department of the Seine in the constituent assembly, but sent in his resignation in the month of May of same year. He died at Paris on July 16, 1857.

**BERAR'**, otherwise known as the Hyderabad Assigned Districts, a province of India, in the Deccan, under the British resident at Haidarabad; area, 17,711 sq. miles, consisting chiefly of an elevated valley at the head of a chain of ghauts. It is watered by several affluents of the Godavari and by the Tapti, and has a fertile soil, producing some of the best cotton, millet, and wheat crops in India. The two principal towns of Berar are Amrāoti (pop. 39,511) and Khamgaon (12,390). Coal and iron ore are both found in the province, the pop. of which is 2,754,016. Exports, \$17,281,740; imports, \$10,504,515. Berar was assigned by the Nizam to the British government in 1853 in security of arrears due.

**BER'BERS**, a people spread over nearly the whole of northern Africa, from whom the name Barbary is derived. The chief branches into which the Berbers are divided are, first, the Amazirgh or Amazigh, of northern Morocco, numbering from 2,000,000 to 2,500,000. They are for the most part quite independent of the Sultan of Morocco. Second, the Shuluh, Shillooh,



Bergen, from the northwest.

or Shellakah, who number about 1,450,000, and inhabit the south of Morocco. They are more highly civilized than the Amazirgh. Third, the Kabyles in Algeria and Tunis, who are said to number 960,000 souls; and fourth, the Berbers of the Sahara, who inhabit the oases. Among the Sahara Berbers the most remarkable are the Beni-Mzāb and the Tuaregs. To these we may also add the Guanches of the Canary Islands, now extinct, but undoubtedly of the same race. The Berbers generally are about the middle height; their complexion is brown, and sometimes almost black, with brown and glossy hair. They are sparely built, but robust and graceful; the features approach the European type. Their language has affinities to the Semitic group, but Arabic is spoken along the coast. They are believed to represent the ancient Mauritians, Numidians, Gætulians, etc. The Berbers live in huts or houses, and practice various industries.

**BER'DITCHEF**, a city of European Russia, gov. of Kiev, with broad streets, well-built houses, numerous industrial establishments, and a very large trade,

having largely-attended fairs. Pop. 78,287, including many Jews.

**BERENICE** (ber-e-ni'sē), the name of several distinguished women of antiquity; in particular the wife of Ptolemy Evergētes, king of Egypt. When her husband went to war in Syria she made a vow to devote her beautiful hair to the gods if he returned safe. She accordingly hung it in the temple of Venus, from which it disappeared, and was said to have been transferred to the skies as the constellation Coma Berenices. Also the wife of Mithridates the Great, king of Pontus; put to death by her husband (about 71 B.C.) lest she should fall into the hands of Lucullus.

**BER'GAMO**, a town of North Italy, capital of the province of Bergamo (1028 sq. miles, 390,775 inhabitants), consists of two parts, the old town situated on hills and having quite an ancient appearance, and the new town almost detached and on the plain.

**BER'GAMOT**, a fruit-tree, a variety or species of the genus *Citrus*, variously classed with the orange, *Citrus Aurantium*, the lime, *Citrus Limetta*, or made a distinct species as *Citrus Bergamia*.

It is probably of eastern origin, though now grown in southern Europe, and bears a pale-yellow pear-shaped fruit with a fragrant and slightly acid pulp. Its essential oil is in high esteem as a perfume.—Bergamot is also a name given to a number of different pears.

**BERGEN** (ber'gen), a seaport on the w. coast of Norway, the second town of the kingdom, about 25 miles from the open sea, on a bay of the Byford, which forms a safe harbor, shut in by hills which encircle the town on the land side, and promote perpetual rains. The trade is large, timber, tar, train-oil, cod-liver oil, hides, and particularly dried fish (stock-fish) being exported in return for corn, wine, brandy, coffee, cotton, woolens, and sugar. Pop. 72,179.

**BERGH**, Henry, an American philanthropist, founder of the Society for the Prevention of Cruelty to Children, and of the Society for the Prevention of Cruelty to Animals. He was born in New York in 1820, and died there in 1888.

**BER'IBERI**, a disease endemic in parts of India, Ceylon, etc., characterized by paralysis, numbness, difficult



breathing, and often other symptoms, attacking strangers as well as natives, and generally fatal.

**BERING**, or **BEHRING** (bā'ring), Vitus, a famous navigator, born in 1680 at Horsens, Jutland. The courage displayed by him as captain in the navy of Peter the Great during the Swedish wars led to his being chosen to command a voyage of discovery in the Sea of Kamtschatka. In 1728 and subsequently he examined the coasts of Kamtschatka, Okhotsk, and the north of Siberia, ascertaining the relation between the northeastern Asiatic and northwestern American coasts. Returning from America in 1741, he was wrecked upon the desert island of Awatska (Bering's Island), and died there.

**BERING'S STRAIT, SEA, and ISLAND.** The strait is the channel separating the continents of Asia and America, and connecting the North Pacific with the Arctic Ocean; breadth at the narrowest part, between Cape Prince of Wales and East Cape, about 36 miles; depth in the middle, from 29 to 30 fathoms. It is frozen in winter, and seldom free from fog or haze. Though named after Vitus Bering, it was only fully explored by Cook in 1778.—Bering's Sea, sometimes called the Sea of Kamtschatka, is that portion of the North Pacific Ocean lying between the Aleutian Islands and Bering's Strait.—Bering's Island, the most westerly of the Aleutian chain, off the east coast of Kamtschatka. It is uninhabited, and is without wood.

Bering Sea and its fisheries have been the occasion of a long dispute between the United States and Great Britain because of the seal poaching of unlicensed Canadian fishers. Seals are abundant in these waters, and the fisheries have been leased by the United States to the North American Commercial Company, a limit of 100,000 being placed on the annual catch, and \$10 a hide royalty being paid to the government. Canadian fishing schooners have frequently been seized by American war vessels. Protests from Britain followed and a court of arbitration met in 1893 at Paris to settle the dispute. Restrictions were agreed to, but the agreement was without effect. In 1897 the Bering Sea seal treaty was signed, which will do much to prevent the slaughter of the seals.

**BERKELEY** (bérk'li) a city in Alameda Co., Cal., 5 miles north of Oakland, the county seat; on the California and Nevada and the Southern Pacific railroads. Pop. 15,000.

**BERKELEY** (bérk'li), Dr. George, Bishop of Cloyne in Ireland, celebrated for his ideal theory. He maintains that the belief in the existence of an exterior material world is false and inconsistent with itself; that those things which are called sensible material objects are not external but exist in the mind, and are merely impressions made on our minds by the immediate act of God, according to certain rules termed laws of nature, from which he never deviates; and that the steady adherence of the Supreme Spirit to these rules is what constitutes the reality of things to his creatures,

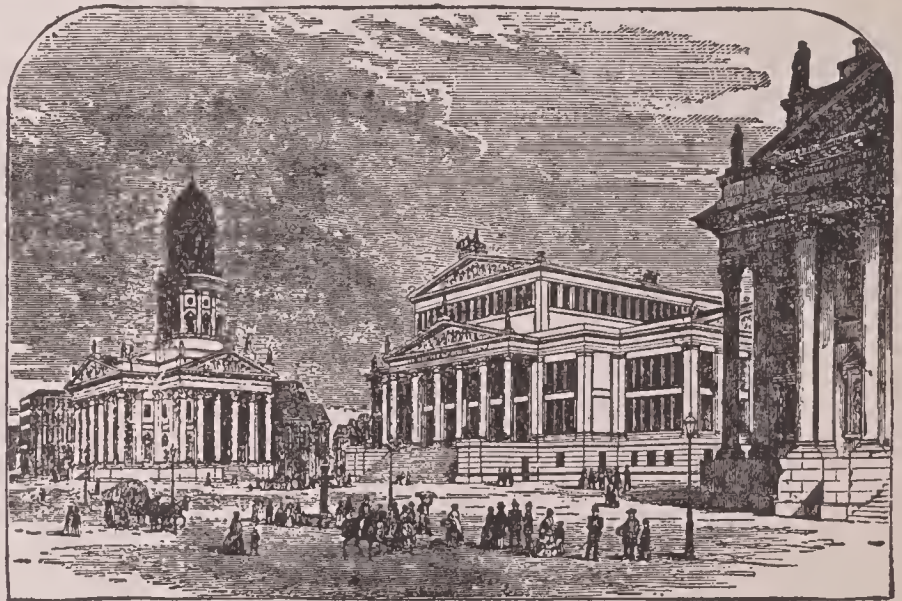
and so effectually distinguishes the ideas perceived by sense from such as are the work of the mind itself or of dreams, that there is no more danger of confounding them together on this hypothesis than on that of the existence of matter. He was born in 1685, died 1753.

**BERK'HAMPSTEAD**, Great, a town in England, Hertfordshire, with manufactures of straw-plait and wooden ware. Birthplace of Cowper. Pop. 5219.

**BERKSHIRE**, or **BERKS**, a county of England, between Oxfordshire, Buckinghamshire, Surrey, Hampshire, and Wilts; area, 450,132 acres, of which eight-ninths are cultivated or under timber. A range of chalk hills, entering from Oxfordshire, crosses Berkshire in a westerly direction. The western and central parts are the most productive in the county, which contains rich pasturage and excellent dairy farms, and is especially suited for barley and wheat crops. The Thames skirts the county on the north, and connects the towns of Abingdon, Wallingford, Reading, Henley, Maidenhead, and Windsor with the metropolis. Pop. 254,931.

**BERLIN**, the largest town in Germany; capital of the Prussian dominions and of the German Empire, in the province of Brandenburg. It has water communication to the North Sea by the

museums, royal academy, etc.; while at the w. end is the Brandenburg Gate, regarded as one of the finest portals in existence. One of the most remarkable of modern monuments is that erected in 1851 to Frederick the Great in the Unter den Linden. The literary institutions of the city are numerous and excellent; they include the university, having an educational staff of nearly 360 professors and teachers, and attended by over 5000 students, exclusive of 5000 others who do not matriculate; the academy of sciences; the academy of fine arts; and the technical high school or academy of architecture and industry. The oldest parts of the city were originally poor villages, and first rose to some importance under Markgraf Albert (1206–20), yet about two centuries ago Berlin was still a place of little consequence, the first important improvement being made by the great Elector Frederick William, who planted the Unter den Linden, and in whose time it already numbered 20,000 inhabitants. Under his successors Frederick I. and Frederick the Great the city was rapidly enlarged and improved, the population increasing fivefold in the hundred years preceding the death of Frederick the Great and tenfold in the century succeeding it. Pop. 1,884,151.



Berlin—Royal theater and new church in the Gensdarmenmarkt.

Spree, which flows into the Havel, a tributary of the Elbe, and to the Baltic by canals connecting with the Oder. Of the numerous bridges, the finest is the Castle (Schloss) Bridge, 104 feet wide, and having eight piers surmounted by colossal groups of sculpture in marble. The principal and most frequented street, Unter den Linden ("under the lime-trees"), is about two-thirds of a mile in length and 160 feet wide, the center being occupied by a double avenue of lime-trees. At the e. end of this street, and round the Lustgarten, a square with which it is connected by the Schloss Bridge, are clustered the principal public buildings of the city, such as the royal palace, the palace of the crown-prince, the arsenal, the university, the

Treaty of Berlin, the treaty, signed 13th July, 1878, at the close of the Berlin Congress, which was constituted by the representatives of the six great powers and Turkey. The treaty of San Stefano previously concluded between Turkey and Russia was modified by the Berlin treaty, which resulted in the division of Bulgaria into two parts, Bulgaria proper and Eastern Roumelia, the cession of parts of Armenia to Russia and Persia, the independence of Rumania, Servia, and Montenegro, the transference of Bosnia and Herzegovina to Austrian administration, and the retrocession of Bessarabia to Russia. Greece was also to have an accession of territory. The British representatives were Beaconsfield, Salisbury, and Lord



Odo Russell. By a separate arrangement previously made between Britain and Turkey the former got Cyprus to administer.

**BERMU'DA GRASS**, a grass cultivated in the West Indies, United States, etc., a valuable fodder grass in warm climates.

**BERMU'DAS, or SOMERS ISLANDS**, a cluster of small islands in the Atlantic Ocean belonging to Britain, and numbering about 400, set within a space of about 20 miles long and 6 wide; area, 20 sq. miles or 12,000 acres; 18 or 20 only inhabited. They were first discovered by Juan Bermudez, a Spaniard, in 1522; in 1609 Sir George Somers, an Englishman, was wrecked here, and, after his shipwreck, formed the first settlement. The most considerable are St. George, Bermuda or Long Island (with the chief town Hamilton, the seat of the governor), Somerset, St. David's, and Ireland. They form an important British naval and military station. An immense iron floating-dock, capable of receiving a vessel of 3000 tons, was towed from London to the Bermudas in 1868. The climate is generally healthful and delightful, but they have been sometimes visited by yellow fever. Numbers of persons from the U. States and Canada now pass the colder months of the year in these islands. About 4000 acres are cultivated. The military stationed here usually number about 1500. Pop. 17,535.

**BERN**, a town in Switzerland, capital of the canton Bern, and, since 1848, of the whole Swiss Confederation. Among the public buildings are the great Gothic cathedral, built between 1421 and 1502; the Church of the Holy Spirit; the federal-council buildings (or parliament house), commanding a splendid view of the Alps; the university; the town-house, a Gothic edifice of the 15th century; the mint; several fine bridges; etc. It has an excellent public and other libraries, museum, etc. Bern became a free city of the empire in 1218. In 1353 it entered the Swiss Confederacy. Pop. 63,994.—The canton of Bern has an area of 2660 sq. miles. The northern part belongs to the Jura mountain system, the southern to the Alps; between these being an elevated undulating region where is situated the Emmenthal, one of the richest and most fertile valleys in Switzerland. The southern part of the canton forms the Bernese Oberland (Upperland). The lower valleys here are fertile and agreeable; higher up are excellent Alpine pastures; and above them rise the highest mountains of Switzerland (Finsteraarhorn, Schreckhorn, Wetterhorn, Eiger, and Jungfrau). The canton is drained by the Aar and its tributaries; the chief lakes are those of Brienz, Thun, and Bienne. Of the surface over 58 per cent is under cultivation or pasture. Agriculture and cattle-raising are the chief occupations; manufactures embrace linen, cotton, silk, iron, watches, glass, pottery, etc. Bienne and Thun are the chief towns after Bern. Pop. (1900), 586,918, 87 per cent being Protestants, and nearly as many German-speaking.

**BERNADOTTE** (ber-nà-dot), Jean-Baptiste-Jules, a French general, afterward raised to the Swedish throne, was the son of an advocate of Pau; born in 1764. In 1798 he married Mademoiselle Clary, sister-in-law of Joseph Bonaparte. The following year he became for a short time minister of war, and on the establishment of the empire was raised to the dignity of marshal of France, and the title of Prince of Ponte-Corvo. On the death of the Prince of Holstein-Augustenburg the heir-apparancy to the Swedish crown was offered to the Prince of Ponte-Corvo, who accepted with the consent of the emperor, went to Sweden, abjured Catholicism, and took the title of Prince Charles John. In the maintenance of the interests of Sweden a serious rupture occurred between him and Bonaparte, followed by his accession in 1812 to the coalition of sovereigns against Napoleon. At the battle of Leipzig he contributed effectually to the victory of the allies. At the close of the war strenuous attempts were made by the Emperor of Austria and other sovereigns to restore the family of Gustavus IV. to the crown; but Bernadotte, retaining his position as crown-prince, became King of Sweden on the death of Charles XIII. in 1818, under the title of Charles XIV. During his reign agriculture and commerce made great advances, and many important public works were completed. He died 8th March, 1844, and was succeeded by his son Oscar.

**BER'NARD**, Great St., a celebrated Alpine pass in Switzerland, canton Valais, on the mountain-road leading from Martigny in Switzerland to Aosta in Piedmont, and rising to a height of 8150 feet. On the e. side of the pass is Mount Velan, and on the w. the Pointe de Dronaz. Almost on the very crest of the pass, near a small lake on which ice sometimes remains throughout the year, is the famous Hospice, next to Etna Observatory the highest inhabited spot in Europe. It is a massive stone building, capable of accommodating seventy or eighty travelers with beds, and of sheltering 300, and is tenanted by ten or fifteen brethren of the order of St. Augustine, who have devoted themselves by vow to the aid of travelers crossing the mountains. The institution is chiefly supported by subscriptions and donations. The severest cold recorded is 29° below zero Fah., but it has often been 18° and 20° below zero; and few of the monks survive the period of their vow. The dogs kept at St. Bernard, to assist the brethren in their humane labors, are well known. The true St. Bernard dog was a variety by itself, but this is now extinct, though there are still descendants of the last St. Bernard crossed with a Swiss shepherd's dog. The color of these is yellowish, or white with yellow-gray or brown spots; head large and broad, muzzle short, lips somewhat pendulous, hanging ears. A pagan temple formerly stood on the pass, and classic remains are found in the vicinity. The hospice was founded in 962 by St. Bernard of Menthon, an Italian ecclesiastic, for the benefit of pilgrims to Rome. In May,

1800, Napoleon led an army of 30,000 men, with its artillery and cavalry, into Italy by this pass.

**BERNARD**, Little St., a mountain, Italy, belonging to the Graian Alps, about 10 miles s. of Mont Blanc. The pass across it, one of the easiest in the Alps, is supposed to be that which Hannibal used. Elevation of Hospice, 7192 feet.

**BER'NARD**, Saint, of Clairvaux, one of the most influential ecclesiastics of the middle ages, born at Fontaines, Burgundy, 1091, of a noble family. His austerities, tact, courage, and eloquence speedily gave him a wide reputation; and when, on the death of Honorius III. (1130), two popes, Innocent and Anaclete, were elected, the judgment of Bernard in favor of the former was accepted by nearly all Europe. In 1140 he secured the condemnation of Abelard for heresy; and after the election of his pupil, Eugenius III., to the papal chair, he may be said to have exercised supreme power in the church. He died Aug. 20, 1153. Seventy-two monasteries owed their foundation or enlargement to him; and he left no fewer than 440 epistles, 340 sermons, and 12 theological and moral treatises. He was canonized in 1174.

**BER'NARDINE MONKS**, a name given in France to the Cistercians, after St. Bernard. See Cistercians.

**BERNESE ALPS**, the portion of the Alps which forms the northern side of the Rhone Valley, and extends from the Lake of Geneva to that of Brienz, comprising the Finsteraarhorn, Schreckhorn, Jungfrau, Monk, etc.

**BERNHARDT** (ber-när), Rosine Sara, a French actress, born at Paris 1844. Of Jewish descent, her father French, her mother Dutch, her early life was spent largely in Amsterdam. In 1858 she entered the Paris Conservatoire and gained prizes for tragedy and comedy in 1861 and 1862; but her début at the Théâtre Français in Iphigénie and Scribe's Valérie was not a success. After a brief retirement she reappeared at the Gymnase and the Porte Saint-Martin in burlesque, and in 1867 at the Odéon in higher drama. Her success in Hugo's Ruy Blas led to her being recalled to the Théâtre Français, since which she has abundantly proved her dramatic genius. In 1879 she visited London, and again in 1880, about which time she severed connection with the Comédie Française under heavy penalty. In 1882 she married M. Damala, a Greek. Her tours both in Europe and America have as yet never failed to be successful, despite a somewhat painful eccentricity. She has several times visited the United States.

**BERNICIA**, an ancient Anglian kingdom stretching from the Firth of Forth to the Tees, and extending inland to the borders of Strathclyde. It was united with Deira, and became part of the kingdom of Northumbria.

**BERNICLE GOOSE**. See Barnacle Goose.

**BERNINI** (ber-nē'nē), Giovanni Lorenzo, Italian painter, sculptor, and architect, born 1598. His marble group, Apollo and Daphne, secured him fame at the age of eighteen, and he was em-



ployed by Urban VIII. to prepare plans for the embellishment of the Basilica of St. Peter's. He declined Mazarin's invitation to France in 1644. After his return to Rome he was charged with the decoration of the bridge of St. Angelo, the tomb of Alexander VII., etc. He died in 1680.

**BERRY**, a succulent fruit, in which the seeds are immersed in a pulpy mass inclosed by a thin skin. The name is usually given to fruits in which the calyx is adherent to the ovary and the placentas are parietal, the seeds finally separating from the placenta and lying loose in the pulp. The term, however, is frequently used to include fruits in which the ovary is free and the placentas central, as the grape. Popularly it is applied to fruits like the strawberry, bearing external seeds on a pulpy receptacle, but not strictly berries.

**BERSERK'ER**, a Scandinavian name for warriors who fought in a sort of frenzy or reckless fury, dashing themselves on the enemy in the most regardless manner. The name is probably derived from the bear-sark or bearskin shirt worn by early warriors.

**BERTHIER** (bert-yā), Alexander, prince of Neuchâtel and Wagram, marshal, vice-constable of France, etc.; born 1753. In all Napoleon's expeditions he was one of his closest companions, on several occasions rendering valuable services, as at Wagram in 1809, when he gained the title of Prince of Wagram. He left a son, Alexander (b. 1810, d. 1887), one of the most zealous adherents of Napoleon III.

**BERTHOLLET** (ber-to-lā), Claude Louis, Count, an eminent French chemist, born 1748; studied medicine; became connected with Lavoisier; was admitted in 1780 member of the Academy of Sciences at Paris. His chief chemical discoveries were connected with the analysis of ammonia, the use of chlorine in bleaching, the artificial production of niter, etc. He died in Paris 1822.

**BERTILLON SYSTEM**, a method of identifying individuals, originated by Dr. Alphonse Bertillon of Paris in 1885, and widely used by the police of Europe and America. The criminal, when captured, is carefully measured as follows: height, outstretched arms, finger tips to finger tips, trunk (height sitting), length and width of head, and of right ear; length of left foot, left middle finger, left little finger, left forearm. Each description is placed on a card, the cards classified according to size of head, etc., and suspects are readily tested. The system is founded on absolutely sure scientific data, but general description and marks of identification, such as scars, etc., are also used with Bertillon's plan.

**BERWICK** (ber'ik), or, more fully, **BERWICK-ON-TWEED**, a seaport town of England. In the beginning of the 12th century, during the reign of Alexander I., Berwick was part of Scotland, and the capital of the district called Lothian. In 1216 the town and castle were stormed and taken by King John; Bruce retook them in 1318; but, after undergoing various sieges and vicissitudes, both were surrendered to Ed-

ward IV. in 1482, and have ever since remained in possession of England. Pop. 13,378.—The county of Berwick, the most eastern border-county of Scotland, is bounded by the German Ocean, East Lothian, Roxburgh, Peebles, the river Tweed, and the English borders. Total area, 297,161 acres, of which two-thirds are productive. The principal rivers are the Tweed, the Leader, the Eye, the Whiteadder, and Blackadder. Pop. 30,816.

**BER'YL**, a colorless, yellowish, bluish, or less brilliant green variety of emerald, the prevailing hue being green of various shades, but always pale, the want of color being due to absence of chromium, which gives to the emerald its deep rich green. Its crystals, which are six-sided, are usually longer and larger than those of the precious emerald, and its structure more distinctly foliated. The best beryls are found in Brazil, in Siberia, and Ceylon, and in Dauria, on the frontiers of China. Beryls are also found in many parts of the U. States. Some of the finer and transparent varieties of it are often called aquamarine.

**BERYLLIUM**, a metal occurring in beryl and other minerals, of a color similar to zinc.

**BESANT**, Sir Walter, English novelist, born 1836, educated in London and at Christ's College, Cambridge, where he graduated with mathematical honors. He is best known by his novels, a number of which were written in partnership with Mr. James Rice, including *Ready-Money Mortiboy*; *The Golden Butterfly*; *The Monks of Thelema*; etc. After Mr. Rice's death (1882) he wrote *All Sorts and Conditions of Men*; *The World Went Very Well Then*; etc. He died in 1901.

**BESSARA'BIA**, a Russian province stretching in a northwesterly direction from the Black Sea, between the Pruth and Danube and the Dniester. In the north the country is hilly, but in the south flat and low. It is fertile in grain, but is largely used for pasture. Capital, Kishenef. Pop., chiefly Walachians, Gypsies, and Tatars, 1,933,436.

**BES'SEL**, Friedrich Wilhelm, a German astronomer, born in 1784; appointed in 1810 director of the observatory at Königsberg. In 1840 he called attention to the probable existence of a planetary mass beyond Uranus, resulting in the discovery of Neptune. He died in 1846.

**BES'SEMER**, Sir Henry, English engineer and inventor, was born in Hertfordshire in 1813. He is celebrated for his new and cheap process of rapidly making steel from pig-iron by blowing a blast of air through it when in a state of fusion, so as to clear it of all carbon, and then adding just the requisite quantity of carbon to produce steel—a process which has introduced a revolution in the steel-making trade, cheap steel being now made in vast quantities and used for many purposes in which its price formerly prohibited its application. He was knighted in 1879. He died in 1898.

**BET'EL**, a species of pepper, a creeping or climbing plant, native of the East Indies. The leaves are employed to inclose a piece of the areca or betel-nut

and a little lime into a pellet, which is extensively chewed in the East. The pellet is hot and acrid, but has aromatic and astringent properties. It tinges the saliva, gums, and lips a brick-red, and blackens the teeth.

**BETEL-NUT**, the kernel of the fruit of a beautiful palm found in India and the East, and named from being chewed



Leaf, flowers, and nut of betel palm.

along with betel-leaf. When ripe it is of the size of a cherry, conical in shape, brown externally, and mottled internally like a nutmeg. Ceylon alone exports 70,000 cwt. annually.

**BETH'ANY**, now called El'Azariyeh or Lazarich, a village of Palestine at the base of Mount Olivet, about 2 miles e. of Jerusalem, formerly the home of Martha, Mary, and Lazarus, and the place near which the ascension of our Lord took place.

**BETH'LEHEM**, the birthplace of Christ; a village, formerly a town, in Palestine, a few miles south from Jerusalem. Pop. about 3000, chiefly Christians, who make rosaries, crucifixes, etc., for pilgrims. There are three convents for Catholics, Greeks, and Armenians. A richly adorned grotto lighted with silver and crystal lamps, under the choir of the fine church built by Justinian, is shown as the actual spot where Jesus was born.

**BETHLEHEM**, a town of the United States, founded by Moravians in 1741 in Pennsylvania, on the Lehigh, across which is a bridge connecting it with S. Bethlehem, the seat of Lehigh University. Pop. of both together, 17,064.

**BETROTH'MENT**, a mutual promise or contract between two parties, by which they bind themselves to marry. It was anciently attended with the interchange of rings, joining hands, and kissing in presence of witnesses; and formal betrothment is still the custom on the continent of Europe, being either solemn (made in the face of the church) or private (made before witnesses out of the church). As betrothments are contracts, they are valid only between persons whose capacity is recognized by law, and the breach of them may be the subject of litigation.

**BETTING**, the staking or pledging of money or property upon a contingency or issue. The processes of betting may be best illustrated in connection with horse-racing, which furnishes the members of the betting fraternity with their best markets. Bettors are divided into two classes—the backers of horses, and the book-makers or professional betters, who form the betting ring, and make a living by betting against horses ac-



cording to a methodical plan. By the method adopted by the professional better the element of chance is as far as possible removed from his transactions, so that he can calculate, with a reasonable prospect of having his calculations verified, on making more or less profit as the result of a season's engagements. Instead of backing any particular horse, the professional better lays the same sum against every horse that takes the field, or a certain number of them, and in doing so he has usually to give odds, which are greater or less according to the estimate formed of the chance of success which each of the horses has on which the odds are given. In this way, while in the event of the race being won (as is usually the case) by any of the horses entered in the betting-book of a professional better, the latter has always a certain fixed sum (say \$5000) to pay, he receives from the backers of the losers sums which vary in proportion to the odds given. Thus, if a book-maker is making a \$5000 book, and the odds against some horse is 4 to 1, he will, if that horse wins, have to pay \$5000, while, if it loses, he will receive \$1250. It usually depends upon which horse it is that wins a race whether the book-maker gains or loses. If the first favorite wins it is evidently the worst thing that could happen for the book-maker, for, as he is bound to receive the sum of the amounts to which all the horses except one have been backed, the largest deduction must be made from his total receipts on account of the first favorite. Very frequently the receipts of the book-maker are augmented by sums paid on account of horses which have been backed and never run at all. Sometimes, although not often, the odds are given upon and not against a particular horse. Books may also be made up on the principle of betting against any particular horse getting a place among the first three. The odds in this case are usually one-fourth of the odds given against the same horse winning. Another mode of betting is that called a sweepstake, in which a number of persons join in contributing a certain stake, after which each of those taking part in the sweepstake has a horse assigned to him (usually by lot), which he backs, and the backer of the winning horse gains the whole stakes. If there are more persons taking part in the sweepstake than there are horses running some of them must draw blanks, in which case of course their stakes are at once lost.

**BEVERIDGE**, Albert J., an American lawyer and politician, born in Ohio in 1862. In 1899 he was elected United States senator from Indiana.

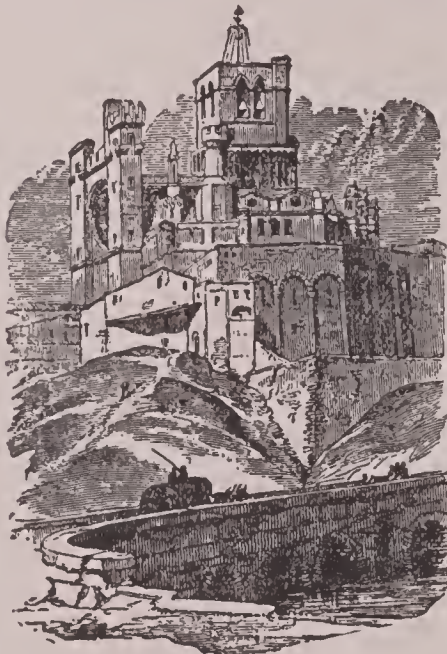
**BEVERIDGE**, Kühne, an American sculptor, born in 1877 at Springfield, Ill. She has won considerable fame in England and France by her clever work.

**BEVERLY**, a city in Essex Co., Mass., 18 miles northeast of Boston; on the Boston and Maine Railroad. It is situated on a narrow coast inlet, which is spanned by a bridge connecting with the city of Salem. Pop. 15,884.

**BEY**. See Beg.

**BEYROUT** (bī-rōt'), or **BEIRUT**, the chief seaport of Syria, 60 miles n.w. of Damascus (89 by railway); pop. 120,000, largely Christians. Ancient Beyrout was an important Phœnician city. The Byzantine emperor Theodosius II. raised it to the rank of a metropolis, and it again rose to importance during the Crusades. In later times it was long in the possession of the Druses. It was bombarded and taken by the British in 1840.

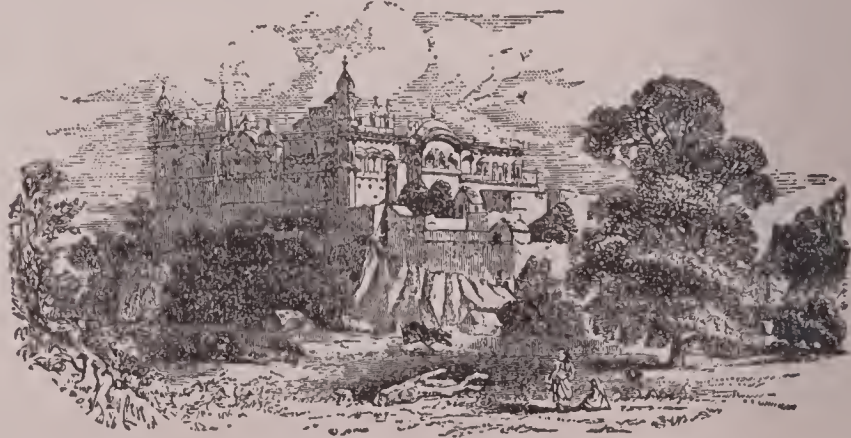
**BEZIERS** (bā-zyār), a town in southern France, dep. Hérault, beautifully situated on a height and surrounded by old walls, its chief edifice being the cathedral, a Gothic structure crowning



The cathedral of Béziers.

the height on which the town stands. Manufactures, woolens, hosiery, liquors, chemicals, etc., with a good trade in spirits, wool, grain, oil, verdigris, and fruits. Pop. 49,186.

**BEZIQUE** (be-zēk'), a simple game of cards most commonly played by two persons with two packs. It was a



The rajah's palace Bhurtpore.

favorite game at the French court in the 18th century.

**BHAGALPUR** (bhā-gal-pōr'), a city in Bengal, capital of a district and division of the same name, on the right bank of the Ganges, here seven miles wide. Pop. 75,760.—The division of

Bhagalpur has an area of 20,511 sq. miles, and a pop. (chiefly Hindus and Mohammedans) of 8,582,490.—The district has an area of 4226 sq. miles; pop. 2,088,565.

**BHOOJ**. See Bhuj.

**BHOPAL** (bho-pāl'), a native state of central India under British protection, on the Nerbudda, in Malwah. Area, 6874 sq. miles. Pop. 1,094,800.—The capital of above state, also called Bhopal, is on the boundary between Malwah and Gundwana. Pop. 77,023.

**BHURTPORE**, a native state, India, in Rajputāna, bounded e. by Agra, s. and w. by the Rajput States. Area, 1974 sq. miles. Pop. 640,620.—The capital, which has the same name, is a fortified place, and was formerly of great strength. The rajah's palace is a large building of red and yellow freestone presenting a picturesque appearance. Pop. 43,601.

**BIBLE**, the collection of the Sacred Writings or Holy Scriptures of the Christians. Its two main divisions, one received by both Jews and Christians, the other by Christians only, are improperly termed Testaments, owing to the confusion of two meanings of the Greek word *diathēkē*, which was applied indifferently to a covenant and to a last will or testament. The Jewish religion being represented as a compact between God and the Jews, the Christian religion was regarded as a new compact between God and the human race; and the Bible is, therefore, properly divisible into the Writings of the Old and New Covenants. The books of the Old Testament received by the Jews were divided by them into three classes: 1. The Law, contained in the Pentateuch or five books of Moses. 2. The Prophets, comprising Joshua, Judges, I. and II. Samuel, I. and II. Kings, Isaiah, Jeremiah, Ezekiel, and the twelve minor prophets. 3. The Ketubim, or Hagiographa (holy writings), containing the Psalms, the Proverbs, Job, in one division; Ruth, Lamentations, Ecclesiastes, Esther, the Song of Solomon, in another division; Daniel, Ezra, Nehemiah, I. and II. Chronicles, in a third.

These books are extant in the Hebrew language; others, rejected from the canon as apocryphal by Protestants, are found only in Greek or Latin.

The books of Moses were deposited, according to the Bible, in the tabernacle, near the ark, the other sacred



writings being similarly preserved. They were removed by Solomon to the temple, and on the capture of Jerusalem by Nebuchadnezzar probably perished. According to Jewish tradition Ezra, with the assistance of the great synagogue, collected and compared as many copies as could be found, and from this collation an edition of the whole was prepared, with the exception of the writings of Ezra, Malachi, and Nehemiah, added subsequently, and certain obviously later insertions in other books. When Judas Maccabæus repaired the temple, which had been destroyed by Antiochus Epiphanes, he placed in it a correct copy of the Hebrew Scriptures, whether the recension of Ezra or not is not known. This copy was carried to Rome by Titus. The exact date of the determination of the Hebrew canon is uncertain, but no work known to be written later than about 100 years after the captivity was admitted into it by the Jews of Palestine. The Hellenistic or Alexandrian Jews, however, were less strict, and admitted many later writings, forming what is now known as the Apocrypha, in which they were followed by the Latin Church. The Protestant churches at the Reformation gave in their adherence to the restricted Hebrew canon, though the Apocrypha was long included in the various editions of the Bible. The division into chapters and verses, as it now exists, is of comparatively modern origin, though divisions of some kind were early introduced. Cardinal Hugo de Sancto Caro, in the 13th century, divided the Latin translation known as the Vulgate into chapters for convenience of reference, and similar divisions were made in the Hebrew text by Rabbi Mordecai Nathan in the 15th century. About the middle of the 16th century the verses in Robert Stephanus's edition of the Vulgate were for the first time marked by numbers.

The earliest and most famous version of the Old Testament is the Septuagint, or Greek translation, executed by Alexandrian Greeks, and completed probably before 130 B.C., different portions being done at different times. This version was adopted by the early Christian church and by the Jews themselves, and has always held an important place in regard to the interpretation and history of the Bible. The Syriac version, the Peshito, made early in the 2d century after Christ, is celebrated for its fidelity. The Coptic version was made from the Septuagint in the 3d or 4th century. The Gothic version, by Ulphilas, was made from the Septuagint in the 4th century; but mere insignificant fragments of it are extant. The most important Latin version is the Vulgate, executed by Jerome, partly on the basis of the original Hebrew and completed in 405 A.D.

The books of the New Testament were all written in Greek, unless it be true, as some critics suppose, that the Gospel of St. Matthew was originally written in Hebrew. Most of these writings have always been received as canonical; but the Epistle to the Hebrews, commonly ascribed to St. Paul, that of St. Jude, the second of Peter, the second and third of John, and the

Apocalypse, have been doubted. The three oldest MSS. are: (1) the Sinaitic MS., discovered by Tischendorf in a convent on Mount Sinai in 1859, assigned to the middle of the 4th century; (2) the Vatican MS. at Rome of similar date; (3) the Alexandrine MS. in the British Museum, assigned to the middle of the 5th century. Each MS. contains also the Septuagint Greek of the Old Testament in great part. The Vulgate of Jerome embraces a Latin translation of the New as well as of the Old Testament, based on an older Latin version. The division of the text of the New Testament into chapters and verses was introduced later than that of the Old Testament; but it is not precisely known when or by whom. The Greek text was first printed in the Complutensian Polyglot, in 1514; in 1516 an edition of it was published at Basel by Erasmus. Among recent valuable editions are those of Lachmann, Tischendorf, Tregelles, and Westcott and Hort.

Of translations of the Bible into modern languages the English and the German are the most celebrated. Considerable portions were translated into Anglo-Saxon, including the Gospels and the Psalter. Wycliffe's translation of the whole Bible (from the Vulgate) begun about 1356, was completed shortly before his death, which took place in 1384. The first printed version of the Bible in English was the translation of William Tindall or Tyndale, whose New Testament was printed in quarto at Cologne in 1525, a small octavo edition appearing at the same time at Worms. The Pentateuch was published by Tindall in 1530, and he also translated some of the prophetic books. A translation of the entire Bible was published by Miles Coverdale in 1535. It was undertaken at the instance of Thomas Cromwell, and being made from German and Latin versions was inferior to Tindall's. After the death of Tindall John Rogers undertook the completion of his translation and the preparation of a new edition. In this edition the latter part of the Old Testament (after II. Chronicles) was based on Coverdale's version. A revised edition was published in 1539 under the superintendence of Richard Taverner. In the same year as Taverner's another edition appeared, printed by authority, with a preface by Cranmer, and hence called Cranmer's Bible. This was the first Bible printed by authority in England. This continued, with various revisions, to be the authorized version till 1568. In 1557-60 an edition appeared at Geneva, based on Tindall's—the work of Whittington, Coverdale, Goodman, John Knox, and other exiles—and commonly called the Geneva, or Breeches Bible (from "breeches" standing instead of "aprons" in Gen. iii. 7.) This version, for sixty years the most popular in England, was allowed to be printed in England under a patent of monopoly in 1561. It was the first printed in Roman letters, and was also the first to adopt the plan previously adopted in the Hebrew of a division into verses. It omitted the Apocrypha, left the authorship of the Epistle to the Hebrews open, and put

words not in the original in italics. The Bishop's Bible, published 1568 to 1572, was based on Cranmer's, and revised by Archbishop Parker and eight bishops. It succeeded Cranmer's as the authorized version, but did not commend itself to scholars or people. In 1582 an edition of the New Testament, translated from the Latin Vulgate, appeared at Rheims, and in 1609-10 the Old Testament was published at Douay. This is the version recognized by the Roman Catholic Church.

In the reign of James I. a Hebrew scholar, Hugh Broughton, insisted on the necessity of a new translation, and at the Hampton Court Conference (1604) the suggestion was accepted by the king. The work was undertaken by forty-seven scholars divided into six companies, two meeting at Westminster, two at Oxford, and two at Cambridge, while a general committee meeting in London revised the portions of the translation finished by each. The revision was begun in 1607, and occupied three years, the completed work being published in folio in 1611. By the general accuracy of its translation and the purity of its style it superseded all other versions. In response, however, to a widely-spread desire for a translation even yet more free from errors, the Convocation of Canterbury in 1870 appointed a committee to consider the question of revising the English version. Their report being favorable two companies were formed, one for the Old Testament and one for the New, consisting partly of members of Convocation and partly of outside scholars. Two similar companies were also organized in America to work along with the British scholars. The result was that the revised version of the New Testament was issued in 1881; that of the Old Testament in 1885. The revision has been carried out in a spirit of reverence toward the older version, and few alterations have been admitted but such as have been called for on the score of accuracy, clearness, and uniformity.

In Germany some seventeen translations of the Bible, partly in the High German partly in the Low German dialect, appeared between the invention of printing and the Reformation, but they had all to make way for Luther's great translation—the New Testament in 1522, and the whole Bible in 1534.

**BIBLE CHRISTIANS**, a small sect founded by a Cornish Methodist preacher called O'Bryan, who profess to follow only the doctrines of the Bible and reject all human authority in religion. Called also Bryanites.

**BIBLE COMMUNISTS**. See Perfectionists.

**BIBLICAL CRITICISM**, a term by which is designated any investigation of the Old or New Testament. "Text criticism" of the Bible seeks to establish the true texts of the Bible, that is, to decide what has been added to the original documents. The so-called higher criticism has for its function the establishment of the historical accuracy of the Scriptures and the genuineness of the authorship. The critic relies on what is called internal and external evidence, checking the historical accu-



racy of the statements in the text, the agreements of the texts among themselves, and the alleged authorship by the contents of the texts and the known facts of history as found in profane history. Modern criticism began in the latter part of the 18th century and culminated with the "Tuebingen school," some of the members of which denied the divinity of Jesus.

**BIBLE SOCIETIES**, societies formed for the distribution of the Bible or portions of it in various languages, either gratuitously or at a low rate. Since the formation of the British and Foreign Bible Society it has circulated over 340 versions of the whole or parts of the Scriptures in 298 different languages. In more than thirty instances languages have for the first time been reduced to a written form in order to translate into them and circulate among the people the Bibles of this society. The total issues now amount to about 100,000,000 copies, while about 70,000,000 additional copies have been distributed by the kindred societies which have sprung out of it. In the United States the great American Bible Society, formed in 1816, acts in concert with auxiliary societies in all parts of the Union. Its total issue since its organization has been over 40,000,000.

**BIB'LIA PAU'PERUM**, the name for block-books common in the middle ages, and consisting of a number of rude pictures of Biblical subjects with short explanatory text accompanying each picture.

**BIBLIOG'RAPHY**, the knowledge of books, in reference to the subjects discussed in them, their different degrees of rarity, curiosity, reputed and real value, the materials of which they are composed, and the rank which they ought to hold in the classification of a library. The subject is sometimes divided into general, national, and special bibliography, according as it deals with books in general, with those of a particular country, or with those on special subjects or having a special character (as early printed books, anonymous books). A subdivision of each of these might be made into material and literary, according as books were viewed in regard to their mere externals or in regard to their contents.

**BIBLIOMA'NIA**, a passion for possessing curious books, which has reached its highest development in France and England, though originating in Holland toward the close of the 17th century. The true bibliomanist is determined in the purchase of books, less by the value of their contents, than by certain accidental circumstances attending them, as that they belong to particular classes, are made of singular materials, or have something remarkable in their history.

**BICARBONATE**, a carbonate derived from carbonic acid by replacing one of the atoms of hydrogen by a metal. Bicarbonate of sodium is used as an antacid, and effervescing liquors are usually produced by mixing it with tartaric acid. It is also the chief ingredient of baking-powder.

**BI'CEPS**, the large muscle in front of the upper arm. See Arm.

**BI'CYCLE**, a light vehicle impelled by the rider, consisting of two wheels placed one before the other, and of connecting bars or framework. The vehicle is driven by the pressure of the rider's feet either directly applied to two cranks attached to the axle of the front wheel, or to cranks in the frame driving the after-wheel by a chain and sprockets. The rider sits upon a saddle generally placed above and between the two wheels, and steers the machine by a handle, which turns the front wheel in in any required direction. It is kept in an upright position by the action of the rider's body and legs, by the steering power, and also by its own momentum. The speed attained by an expert rider is considerable, 30 miles or more an hour having been covered.

**BIDDEFORD** (bid'e-ford), a town in Maine, on the Saco, with which it is connected by several bridges. The river falls, 42 feet high, affording valuable water-power. Pop. 16,145.

**BIDDLE**, John, father of the modern Unitarians, born in 1615 at Wotton-under-Edge, in Gloucestershire, died in prison 1662. He was repeatedly imprisoned for his anti-Trinitarian views. A general act of oblivion in 1652 restored him to liberty, when he immediately disseminated his opinions both by preaching and by the publication of his Twofold Scripture Catechism. He was again imprisoned. Cromwell banished him to St. Mary's Castle, Scilly, and assigned him a hundred crowns annually. Here he remained three years, until the Protector liberated him in 1658. He then continued to preach his opinions till the death of Cromwell, and also after the Restoration, when he was committed to jail in 1662, and died a few months after.

**BIEL** (bēl). See Bienne.

**BIELA'S** (bē'la) **COMET**, discovered by M. Biela (1782-1856), an Austrian officer, in 1826. Its periodic time was determined as 6 years 38 weeks. It returned in 1832, 1839, 1846, and 1852. On the latter two occasions it was in two parts, each having a distinct nucleus and tail. It has not since been seen as a comet; but in 1872, 1879, and 1885, when the earth passed through the comet's track, immense flights of meteors were seen, which have been connected with the broken-up and dispersed comet.

**BIEN'NIAL**, a plant that requires two seasons to come to maturity, bearing fruit and dying the second year, as the turnip, carrot, wallflower, etc.

**BIERSTADT**, Albert, an American landscape painter, born at Düsseldorf, Germany, 1830, died in 1902. His principal paintings are of the Rocky Mountain regions.

**BIGAMY**, the act or state of having more wives or husbands than one. It is regarded as an offense in most countries, and in the U. States it is a felony, punishable by a term in the penitentiary, the length of the term varying in different states. To be guilty of bigamy the offender must have knowledge of the fact that his or her spouse is living, and the second or other marriage must be solemnized by form of law or church, or other formal ceremony, and not

merely a personal agreement or contract. Bigamy may be committed by persons of either sex.

**BIG HORN**, a river of the U. States rising in the Rockies and flowing through Montana into the Yellowstone river. It is 460 miles long.

**BIG HORN**, a popular name for the celebrated Rocky Mountain sheep, which, in its several species, is found along the whole course of the Rocky Mountain system to the Arctic regions. The common species is 3 feet 4 inches high, brownish in color, with a dark line along the spine. The horns of the ram are massive, spiral-like, and often measure 45 inches in length. The big horn is a marvelous jumper, scaling great heights almost perpendicular, and one of the hardest of the wild animals of America. It is called also Rocky Mountain goat.

**BIGELOW**, Erastus Brigham, an American inventor, born in Massachusetts in 1814, died 1879. His principal inventions are weaving apparatus. He founded the Bigelow Carpet Company of Clinton, Mass., and was one of the founders of the Massachusetts Institute of Technology.

**BIGELOW**, Poultney, an American writer, traveler, and critic. He was born in 1855, and was educated at Yale and abroad. He has been editor of *Outing*, and correspondent of numerous publications. He has published several books of travel and criticism on foreign countries.

**BIGNO'NIA**, a genus of plants of many species, inhabitants of hot climates, usually climbing shrubs furnished with tendrils; flowers mostly in terminal or axillary panicles; corolla trumpet-shaped, hence the name of trumpet-flower commonly given to these plants. All the species are splendid plants when in blossom, and many of them are cultivated.

**BIKANER'**, a native state of Rajputana, India. Area, 23,090 sq. miles; pop. 584,712.—Bikaner, the capital, has a fort, containing the rajah's palace. Pop. 53,075.

**BILASPUR** (bi-lās-pör'), a district in the chief commissionership of the Central Provinces of India. Area 8341 sq. miles; pop. 1,164,158.

**BILBA'O**, a city in northern Spain, capital of the province of Biscay on the navigable Nervion, 6 miles from the sea. It has a cathedral and fine public buildings; flourishing industries; iron-works, steel-works, foundries, shipyards, etc.; excellent harbor accommodation, and exports much iron ore. Pop. 83,306.

**BILBERRY**. See Whortleberry.

**BILE**, a yellow bitter liquor, separated from the blood by the primary cells of the liver, and collected by the biliary ducts, which unite to form the hepatic duct, whence it passes into the duodenum, or by the cystic duct into the gall-bladder, to be retained there till required for use. The most obvious use of the bile in the animal economy is to aid in the digestion of fatty substances and to convert the chyme into chyle. It appears also to aid in exciting the peristaltic action of the intestines. The natural color of the feces seems to be owing to the presence of bile. The



chemical composition varies with the animal which yields it, but every kind contains two essential constituents, the bile salts and the bile coloring matter associated with small quantities of cholesterine, fats, and certain mineral salts, chiefly chloride of sodium, phosphates, and iron. Some of the constituents of the bile return into the blood by absorption, the coloring matters and cholesterine being the principal excrementitious substances. When bile is not secreted in due quantity from the blood the unhealthy condition of biliousness results.

**BILGE**, the breadth of a ship's bottom, or that part of her floor which approaches to a horizontal direction, on which she would rest if aground.—Bilge-water, water which enters a ship and lies upon her bilge or bottom; when not drawn off it becomes dirty and offensive.—Bilge ways, planks of timber placed under a vessel's bilge on the building-slip to support her while launching.

**BIL'IARY CAL'ULUS**, a concretion which forms in the gall-bladder or bile-ducts; gall-stone. It is generally composed of a peculiar crystalline fatty matter which has been called cholesterine.

**BILL**, a written or printed paper containing a statement of any particulars. In common use a tradesman's account, or a printed proclamation or advertisement, is thus called a bill. In legislation a bill is a draft of a proposed statute submitted to a legislative assembly for approval, but not yet enacted or passed and made law. When the bill has passed and received the necessary assent, it becomes an act.

**BILL OF ATTAINDER**, a bill introduced in a legislature fixing a penalty or punishment on an individual by enactment of the legislature. Bills of attainder are forbidden by the constitution of the United States. This provision was prompted by the abuses wrought in England by this method of punishment.

**BILL OF COSTS**, a statement of the costs of a lawsuit, fixed to the judgment, and chargeable to the defeated party to the suit.

**BILL OF CREDIT**, a letter of credit. In the United States constitution the term "bills of credit" means no more than paper money. The states are forbidden to issue bills of credit; that is, no state can issue paper money, this function being a federal one.

**BILL OF EXCEPTIONS**, a statement of the exceptions taken to the ruling of a court in a cause. The bill of exceptions is used for purposes of appeal.

**BILL OF EXCHANGE**, a written order to pay a sum of money to a third party. The order may be to pay at sight or after a certain number of days. If the person on whom the order is made accepts it, by signing it he is liable for its payment.

**BILL IN EQUITY**, a petition filed in a court of chancery stating all the circumstances of the case in dispute and asking the chancery judge, or chancellor, to decide the points at issue. The custom arose from the old English me-

thod of appealing directly to the conscience of the king.

**BILL OF HEALTH**, a statement of the condition of the health of the crew and passengers of a ship, made by the ship's surgeon or the captain. A clean bill of health reports no infection on ship board; a foul bill reports passengers unfit to land; a suspected bill reports infection at the place whence the ship sailed.

**BILL OF INDEMNITY**, a bill passed by congress justifying the action of an official who, under stress of circumstance, has exceeded his authority.—Also a bill to reimburse one who has spent his own money in the service of the state.

**BILL OF LADING**, an agreement or contract made by a common carrier with a shipper providing for the transportation of the goods or freight mentioned, the rate of transportation, and the liabilities of both parties. Bills of lading are made out in duplicate, the latter being sent to the consignee. Bills of lading are not negotiable, but are often so used, and some states have even tried to make them negotiable by law.

**BILL OF RIGHTS**, the name given to the ten first amendments to the constitution of the United States.

**BILL OF SALE**, a conveyance of property from one person to another, containing the description of the property and transferring the title of the property to the buyer.

**BILLIARDS**, a game played with three or four ivory balls and a stick, called a "cue," on a large table the sides of which are banked with rubber, the whole being covered with green baize. Considerable difference exists between the English and the French game, the latter being the game played in the U. States. The English table is 6x12 feet, has six pockets and three balls, two white and a red being used. In the U. States pockets are not used. The American table is about 6x12, the cue is ash or maple with a leather tip, the balls ivory, 2½ inches in diameter, the color being two white and one red. The object of the player is so to strike his own ball that it will, after leaving his cue, come into contact with the two remaining balls. The rebound from the first ball is called a carom, and when both balls are hit the play counts one point. By playing along the cushions (banked sides of the table) a skilful player can count points indefinitely. To prevent this the game called "the balk-line game" was invented. In this game four lines are drawn parallel with the cushion at an agreed upon distance and the player is allowed to make but one shot, or an agreed-upon number of shots, when one or both balls lie between the line and the cushion. The three-ball game without the balk-line is called the straight-rail game. The following is a list of high runs made since 1880: Straight rail—highest run for match play (3 balls, on regulation 5x10 table) 1531 points, Maurice Vignaux, Paris, 1880. Highest average for match play, 333½, by Jacob Schaefer, Chicago, 1879. Cushion caroms—highest run for tournament play, 85 points, Frank C. Ives, Boston, 1896. Highest

average for tournament play, 10 (in 200 points), Jacob Schaefer, Chicago, 1887. Highest average (with "anchor nurse" allowed), 100, Jacob Schaefer, New York, 1893, and Frank C. Ives, Chicago, 1894. Highest average (with "anchor nurse" barred), 63 2-10, Frank C. Ives, New York, 1894. 18-inch balk-line—highest run for tournament play, 290 points (with 5 shots allowed in "anchor" spaces), Frank C. Ives, New York, 1896; 140 (with the "anchor nurse" barred), Frank C. Ives, New York, 1897. Highest average for tournament play, 50 (with 5 shots allowed in "anchor" spaces), Frank C. Ives, New York, 1896; 40 (with "anchor nurse" barred), Jacob Schaefer, Chicago, 1898. In 1906 Jacob Schaefer made a run of 100 in an 18.1 match, which is the highest in a championship match.

**BILLINGS**, John Shaw, an American surgeon, born in Indiana in 1837. He was surgeon in the Union army during the civil war, and curator of the military museum at Washington from 1864. In 1896 he became librarian of the New York City Public Library. He has published several scientific works and catalogues and is a member of numerous learned societies.

**BILLINGS, JOSH.** See Henry W. Shaw.

**BIL'LINGSGATE**, the principal fish-market of London, on the left bank of the Thames, a little below London Bridge. From the character, real or supposed, of the Billingsgate fish-dealers, the term Billingsgate is applied generally to coarse and violent language.

**BIL'LION**, in Britain and Germany the designation for a million of millions; among the French and in America a thousand millions. A similar difference of usage exists in regard to trillion, quadrillion, etc.

**BI'MANA**, animals having two hands: a term applied by Cuvier to the highest order of Mammalia, of which man is the type and sole genus. By some naturalists man is classified as a sub-division of the order Primates, which includes also the apes, monkeys, and lemurs.

**BIMET'ALLISM**, that system of coinage which recognizes coins of two metals (silver and gold) as legal tender to any amount; or, in other words, the concurrent use of coins of two metals as a circulating medium, the ratio of value between the two being arbitrarily fixed by law. It is contended by advocates of the system that by fixing a legal ratio between the value of gold and silver, and using both as legal tender, fluctuations in the value of the metals are avoided, while the prices of commodities are rendered steadier.

**BINARY**, twofold; double.—Binary compound, in chemistry, a compound of two elements, or of an element and a compound performing the function of an element, or of two compounds performing the function of elements, according to the laws of combination. The term is now little used.—Binary theory of salts, the theory which regarded all salts as being made up of two oxides, an acid oxide and a basic oxide; thus sodium carbonate as made up of soda and carbon dioxide.—Binary star, a double star



whose members revolve round a common center of gravity.

**BING'HAMPTON**, a town in New York, at the junction of the Chenango and Susquehanna rivers, with numerous manufactures and an extensive flour and lumber trade. Pop. 47,000.

**BINOC'ULAR**, a field-glass or opera-glass, or a microscope suited for viewing objects with both eyes at once.

**BI'OBIO**, a Chilean river, rises in Lake Huchueltui, flows in a n.w. direction for 180 miles, and falls into the Pacific at the city of Concepcion. It gives name to a province of the country, with 100,000 inhabitants; area, 4158 sq. miles.

**BIOGEN'ESIS**, the history of life development generally; specifically, that department of biological science which speculates on the mode by which new species have been introduced; often restricted to that view which holds that living organisms can spring only from living parents.

**BIOG'RAPHY**, that department of literature which treats of the individual lives of men or women; and also a prose narrative detailing the history and unfolding the character of an individual written by another. When written by the individual whose history is told it is called an autobiography. This species of writing is as old as literature itself. In the first century after Christ Plutarch wrote his *Parallel Lives*; Cornelius Nepos, the *Lives of Military Commanders*; and Suetonius, the *Lives of the Twelve Cæsars*. Modern biographical literature may be considered to date from the 17th century, since which time individual biographies have multiplied enormously. Dictionaries of biography have proved extremely useful, Moréri's *Dictionnaire Historique et Critique*, 1671, being perhaps the first of this class. During the 19th century have been published the *Biographie Universelle*, 85 vols., 1811-62; *Nouvelle Biographie Générale*, 46 vols., 1852-66; Chalmers's *General Biographical Dictionary*, 32 vols., 1812-17; Rose's *Biographical Dictionary*, 12 vols., 1848-50; the admirable *Dictionary of National Biography*, 63 vols., the first published in 1885, the last in 1900, with Supplement of other 3 vols. (1901); and Appleton's *Cyclopædia of American Biography*, 6 vols. (1887-1889).

**BIOL'OGY**, a comprehensive term for those departments of science which treat of living beings, including under this head both animals and plants. It therefore comprehends both botany and zoology in all their branches and details.

**BIP'ED**, an animal having two feet: applied to man and birds, indicating their mode of progression rather than the mere possession of two limbs.

**BIRCH**, a genus of trees which comprises only the birches and alders, which inhabit Europe, northern Asia, and North America. The common birch is indigenous throughout the north, and on high situations in the south of Europe. It is extremely hardy, and only one or two other species of trees approach so near to the north pole. The wood of the birch, which is light

in color, and firm and tough in texture, is used for chairs, tables, bedsteads, and the woodwork of furniture generally, also for fish-casks and hoops, and for smoking hams and herrings, as well as for many small articles. In France wooden shoes are made of it. The bark is whitish in color, smooth and shining, separable in thin sheets or layers. Fishing-nets and sails are steeped with it to preserve them. In some countries it is made into hats, shoes, boxes, etc. In Russia the oil extracted from it is used in the preparation of of Russian leather, and imparts the well-known scent to it. In Lapland bread has been made from it. The sap, from the amount of sugar it contains, affords a kind of agreeable wine, which is produced by the tree being tapped during warm weather in the end of spring or beginning of summer, when the sap runs most copiously. The dwarf birch, a low shrub, two or three feet high at most, is a native of all the most northerly regions. The cherry-birch of America, and also the black birch, produce valuable timber, as do other American species. The largest of these is the yellow birch, which attains the height of 80 feet. It is named from its bark being of a rich yellow color. The paper birch of America has a bark that may readily be divided into thin sheets almost like paper. From it the Indian bark canoes are made.

**BIRD**, a great class of vertebrate animals, warm-blooded, covered with feathers and ordinarily capable of flight. They have existed since early times, exhibit an interesting evolution within very compact and well-defined limits, dwell in every part of the globe, are exceedingly diverse in size, form, ability, and appearance, adapted to every sort of climate and food, show mental qualities of a high order, are of great importance in their economic relations with man, and in most cases are beautiful in outline and color and possessed of melodious voices.

Birds are classified between the reptiles (regarded as inferior to them) and the mammals (regarded as superior in general organization). Birds differ from mammals, broadly, in being clothed with feathers instead of hairs, and in the absence of milk-glands, and by sundry differences in anatomy and methods of existence, such as the hatching externally of eggs, and the devotion of the fore limbs to flight. They differ from reptiles in having a covering of feathers instead of scales; a complete double circulation of warm blood; no more than three digits in the manus, long legs, etc. The differences noted are, however, of much less importance than those which separate them from mammals, and the structural resemblance is so close that some anatomists, notably Huxley, have included reptiles and birds in a single group, the *Sauropsida*, comparable to *Fishes* or *Mammals*, and completing, with them, the three divisions of the *Vertebrata*. This grouping was founded upon the fact that birds and reptiles were alike in being oviparous or ovoviviparous; in having a cloaca; in the incompleteness of the

diaphragm, and of a corpus callosum in the brain; in having only one occipital condyle; in the presence of a movable quadrate bone and other peculiarities of the skull; and in the fact that the ankle-joint is between two sets of tarsal bones. The close relationship thus implied has been confirmed by the disclosures of paleontology, which show that birds have a reptilian ancestry, and are an offshoot of the same stock as modern reptiles.

All the species of birds now inhabiting the earth are the descendants of ancient ancestors long since vanished, some of which have, however, left remains behind from which zoologists have reconstructed skeletons of these animals quite accurate in their general features. Tracks have been found in the sandstones of Connecticut which are believed to be of ancient gigantic birds with three toes and a stride of seven feet.

**BIRD-CALL**, an instrument for imitating the cry of birds in order to attract them so that they may be caught.

**BIRD-CATCHING SPIDER**, a name applied to a gigantic spider which preys upon insects and small birds which it hunts for and pounces on. It is about two inches long, very hairy, and almost black; its feet when spread out occupy a surface of nearly a foot in diameter.

**BIRD-CHERRY**, a species of cherry, a very ornamental tree in shrubberies from its purple bark, its bunches of white flowers, and its berries, which are successively green, red, and black. Its fruits is nauseous to the taste, but is greedily eaten by birds. The wood is much used for cabinet-work. It is common in the native woods of Sweden and Scotland.

**BIRD-LIME**, a viscous substance used for entangling birds so as to make them easily caught, twigs being for this purpose smeared with it at places where birds resort. It is prepared from holly-bark, being extracted by boiling; also from the viscid berries of the mistletoe.

**BIRDS**. See Ornithology.

**BIRD OF PARADISE**, the name for members of a family of birds of splendid plumage allied to the crows, inhabiting New Guinea and the adjacent islands. The family includes eleven or twelve genera and a number of species, some of them remarkably beautiful. The largest species is over 2 feet in length. The king bird of paradise is possibly the most beautiful species, but is rare. It has a magnificent plume of feathers, of a delicate yellow color, coming up from under the wings, and falling over the back like a jet of water. The feathers are those chiefly worn in plumes. These splendid ornaments are confined to the male bird.

**BIRD-SEED**, seed for feeding cage-birds, especially the seed of canary-grass.

**BIRD'S-EYE MAPLE**, curled maple, the wood of the sugar-maple when full of little knotty spots somewhat resembling birds' eyes, much used in cabinet-work.

**BIRD'S-EYE VIEW**, the representation of any scene as it would appear if seen from a considerable elevation right above.



**BIRDS'-NESTS**, Edible, the nests of the salangane and other species of swifts found in the Indian seas. They are particularly abundant in the larger islands of the Eastern Archipelago. The nest has the shape of a common swallow's nest, is found in caves, particularly on the sea-shore, and has the appearance of fibrous, imperfectly concocted isinglass. When procured before the eggs are laid the nests are of a waxy whiteness and are then esteemed most valuable; when the bird has laid her eggs they are of second quality; when the young are fledged and flown, a third quality. They appear to be composed of a mucilaginous substance secreted by special glands, and not, as was formerly thought, made from a glutinous marine fucus or seaweed. The Chinese consider the nests as a great stimulant and tonic, and it is said that about 8½ millions of them are annually imported into Canton.



Bird of paradise.

**BIRDS OF PASSAGE**, birds which migrate with the season from a colder to a warmer, or from a warmer to a colder climate, divided into summer birds of passage and winter birds of passage. Such birds always breed in the country to which they resort in summer, i.e. in the colder of their homes.

**BIRDS OF PREY**, the Accipitres or Raptores, including vultures, eagles, hawks or falcons, buzzards, and owls.

**BIR'KENFELD** (-felt), an outlying principality belonging to Oldenburg, surrounded by the Rhenish districts of Coblenz and Treves; area 194 sq. miles; pop. 53,409.

**BIR'KENHEAD**, a parl., county, and municipal borough of England, in Cheshire, on the estuary of the Mersey, opposite Liverpool. Its commerce is in all respects a branch of that of Liverpool. The communication with Liverpool is by large steamboats and by a railway tunnel under the bed of the Mersey 4½ miles long including the approaches, 21 feet high, 26 feet wide, the roof being

about 30 feet below the bed of the river. Pop. 110,926.

**BIRMAH**. See Burmah.

**BIR'MINGHAM**, a great manufacturing city of England, situated on the small river Rea near its confluence with the Tame, in the n.w. of Warwickshire, with suburbs extending into Staffordshire and Worcestershire; 112 miles n.w. of London, and 97 s.e. of Liverpool. It is the principal seat of the hardware manufacture in Britain, producing metal articles of all kinds from pins to steam-engines. It manufactures fire-arms in great quantities, swords, jewelry, buttons, tools, steel-pens, locks, lamps, bedsteads, gas-fittings, sewing-machines, articles of papier-maché, railway-carriages, etc. The quantity of solid gold and silver plate manufactured is large, and the consumption of these metals in electroplating is very great. Japanning, glass manufacturing, and glass-staining or painting form important branches of industry, as also does the manufacture of chemicals. At Soho and Smethwick in the vicinity of the town were the famous works founded by Boulton and Watt, who there manufactured their first steam-engines, where gas was first used, plating perfected, and numerous novel applications tried and experiments made. The principal educational institutions are: The University (opened in 1900), which has developed from the Mason University College, founded by Sir Josiah Mason in 1875, opened in 1880 and united with Queen's College (as the medical department) in 1892; a Roman Catholic college (at Oscott); King Edward's Grammar School; and a school of art and design. Pop. 522,182.

**BIRMINGHAM**, a city and the county seat of Jefferson Co., Ala., and an important manufacturing center, 97 miles northwest of Montgomery, on the Central Railroad of Georgia, the Louisville and Nashville, the Southern, the Alabama Great Southern, and the Kansas City, Memphis, and Birmingham railroads. The chief industry is the manufacture of iron and steel in various forms. Besides pig-iron furnaces, foundries, engine and boiler works, machine-shops, and car-wheel works, it has cotton-factories, packing-houses, cottonseed-oil mills, and extensive iron and coal mining and lumber interests. Pop. 42,000.

**BIRS NIMRUD**, a famous mound in Babylonia, on the west side of the Euphrates, 6 miles s.w. of Hillah, generally identified as the remains of the Tower of Babel.

**BIRTH**, or **LABOR**, in physiology, is the act by which a female of the class Mammalia brings one of her own species into the world. When the fœtus has remained its due time in the womb, and is in a condition to carry on a separate existence, it is extruded from its place of confinement, in order to live the life which belongs to its species, independently of the mother. The period of gestation is very different in different animals, but in each particular species it is fixed with much precision. At the end of the thirty-ninth or the beginning of the fortieth week, the human child has reached its perfect state, and is capable of living separate from the mother;

hence follows in course its separation from her, that is, the birth. Contractions of the womb gradually come on, which are called, from the painful sensations accompanying them, labor-pains. The contractions of the womb take place in the same order as the enlargement had previously done, the upper part of it first contracting, while the mouth of the womb enlarges and grows thin, and the vagina becomes loose and distensible. By this means the fœtus, as the space within the womb is gradually narrowed, descends with a turning motion toward the opening, and some time after the head of the child appears and the rest of the body soon follows. An artificial birth is that which is accomplished by the help of art, with instruments or the hands of the attendant. Premature birth is one which happens some weeks before the usual time, namely, after the seventh and before the end of the ninth month. Late birth is a birth after the usual period of forty weeks. Although this is considered the usual time for legitimate births, the practice of the English law courts is to allow a longer time when the opinions of the faculty, or the peculiar circumstances of the case, are in favor of a protracted gestation. In Scotland a child born after the tenth month is accounted illegitimate. Abortion and miscarriage take place when a fœtus is brought forth so immature that it cannot live. They happen from the beginning of pregnancy to the seventh month, but most frequently in the third month.

**BIRTH MARK**. See Nævus.

**BIRTH'RIGHT**, any right or privilege to which a person is entitled by birth, such as an estate descendible by law to an heir, or civil liberty under a free constitution. See Primogeniture.

**BIS'CAY**, a province of Spain near its northeast corner, one of the three Basque provinces (the other two being Alava and Guipuzcoa), area 850 sq. miles. The surface is generally mountainous; the most important mineral is iron, which is extensively worked; capital, Bilbao. Pop. 290,222.

**BISCAY, BAY OF**, that part of the Atlantic which lies between the projecting coasts of France and Spain, extending from Ushant to Cape Finisterre, celebrated for its dangerous navigation.

**BISCUIT** (bis'kèt), a kind of hard, dry bread which is not liable to spoil when kept. Biscuits are either fermented or unfermented, the kinds in ordinary use being generally fermented, while the unfermented biscuit is much used at sea, and hence called sea-biscuit.

**BISHOP**, the highest of the three orders in the Christian ministry—bishops, priests, and deacons—in such churches as recognize three grades. Originally in the Christian church, the name was used interchangeably with presbyter or elder for the overseer or pastor of a congregation; but at a comparatively early period a position of special authority was held by the pastors of the Christian communities belonging to certain places, and the name of bishop became limited to these by way of distinction. There is much that is doubtful or disputed in regard to the history of the episcopal office. Roman



Catholics and many others hold that it is of divine ordination and existed already in apostolic times; and they maintain the doctrine of the apostolical succession, that is to say, the doctrine of the transmission of the ministerial authority in uninterrupted succession from Christ to the apostles, and through these from one bishop to another. Presbyterians deny that the office was of divine or apostolic origin, and hold that it was an upgrowth of subsequent times easily accounted for, certain of the presbyters or pastors acquiring precedence as bishops over others, just as the bishops of the chief cities (Jerusalem, Antioch, Alexandria, Constantinople, Rome) obtained precedence among the bishops and received the title of metropolitan bishops; while the Bishop of Rome came to be regarded as the head of the church and the true successor of Peter. At present in the R. Catholic Church the bishop is usually elected by the presbyters of the diocese, subject to the approbation of the pope and of the secular power. When the monarch is Roman Catholic a bishopric may be in the royal gift, subject to papal approval. The bishop comes next in rank to the cardinal. His special insignia are the miter and crosier or pastoral staff, a gold ring, the pallium, dalmatica, etc. He guards the purity of doctrine in his diocese, appoints professors in the clerical colleges, licenses books on religious subjects, ordains and appoints the clergy, consecrates churches, takes charge of the management of funds for ecclesiastical or pious purposes, etc. The bishops of the Greek Church have similar functions but on the whole less authority. They are always selected from the monastic orders.

In the Church of England bishops are nominated by the sovereign, who, upon request of the dean and chapter for leave to elect a bishop, sends a *congé d'élire*, or license to elect, with a letter missive, nominating the person whom he would have chosen. The election, by the chapter, must be made within twelve days, or the sovereign has a right to appoint whom he pleases.

In the U. States there are 24 archbishops, and 86 bishops of the Roman Catholic Church, and upward of a hundred bishops of the Protestant Episcopal Church. The Methodist Episcopal Church (North) has 28 bishops, and the Methodist Episcopal Church (South) has twelve. The African Methodist Episcopal in the U. States has 13 bishops, and the Reformed Episcopal Church has seven. There is also a bishop of the Polish Catholic Church, one of the Old Catholic Church, one of the Greek Orthodox Church, and one of the Syrian Greek Orthodox Church in the U. States.

Bishops in *partibus infidelium* (in part occupied by the infidels) are held to be successors of ancient bishops whose dioceses became extinct. Suffragan bishops fill the function of assistants to bishops.

**BISMARCK**, (bis'märk), the capital of North Dakota, and county seat of Burleigh Co., on the Missouri river, and on the Northern Pacific Railroad. In 1883 it was made the capital of

Dakota Territory, and in 1889 was chosen as the state capital of North Dakota.



State capitol, Bismarck, N. D.

**BISMARCK - SCHONHAUSEN** (bis'märk-sheun'hau-zèn), Otto Eduard Leopold, Prince; born of a noble family of the "Mark" (Brandenburg), at Schönhausen, April 1, 1815; studied at Göttingen, Berlin, and Greifswald; entered the army and became lieutenant in the Landwehr. After a brief interval devoted to his estates and to the office of inspector of dikes, he became in 1846 a member of the provincial diet of Saxony, and in 1847 of the Prussian diet. In 1851 he was appointed repre-



Prince Bismarck.

sentative of Prussia in the diet of the German Federation at Frankfort, where with brief interruptions he remained till 1859, exhibiting the highest ability in his efforts to checkmate Austria and place Prussia at the head of the German states. From 1859-62 he was ambassador at St. Petersburg, and in the latter year, after an embassy to Paris of five months' duration, was appointed first minister of the Prussian crown. The Lower House persistently refusing to pass the bill for the reorganization of the army, Bismarck at once dissolved it (Oct., 1862), closing it for four successive sessions until the work of reorganization was complete. When popular feeling had reached its most strained point the Schleswig-Holstein question acted as a diversion, and Bismarck—by the skilful manner in which he added the duchies to Prussian territory, checkmated Austria, and excluded her from the new German confeder-

ation, in which Prussia held the first place—became the most popular man in Germany. As chancellor and president of the Federal Council he secured the neutralization of Luxembourg in place of its cession by Holland to France; and, though in 1868 he withdrew for a few months into private life, he resumed office before the close of the year. A struggle between Germany and France appearing to be sooner or later inevitable, Bismarck, having made full preparations, brought matters to a head on the question of the Hohenzollern candidature for the Spanish throne. Having carried the war to a successful issue, he became chancellor and prince of the new German empire. Subsequently, in 1872, he alienated the Roman Catholic party by promoting adverse legal measures and expelling the Jesuits. He then resigned his presidency for a year, though still continuing to advise the emperor. Toward the close of 1873 he returned to power, retaining his position until, in March, 1890, he disagreed with the emperor and tendered his resignation. In 1878 he presided at the Berlin Congress, in 1880 at the Berlin Conference, and in 1884 at the Congo Conference. His life was twice attempted—at Berlin in 1866, and at Kissingen in 1874. He died in 1898.

**BIS'MUTH**, a metal of a yellowish or reddish-white color, and a lamellar texture. It is somewhat harder than lead and not malleable, when cold being so brittle as to break easily under the hammer, so as to be reducible to powder. Its internal face or fracture exhibits large shining plates variously disposed. It fuses at 476° Fahr., and expands considerably as it hardens. It is often found in a native state, crystallized in rhombs or octahedrons, or in the form of dendrites, or thin laminae investing the ores of other metals, particularly cobalt. Bismuth is used in the composition of pewter, in the fabrication of printers' types, and in various other metallic mixtures. The subnitrate or basic nitrate of bismuth is used as a paint and as a cosmetic, and is known as Pearl White or Pearl Powder.

**BI'SON**, the name applied to two species of ox. One of these, the European bison or aurochs, is now nearly extinct, being found only in the forests of Lithuania and the Caucasus. The other, or American bison, improperly



American bison.

termed buffalo, was formerly found over a wide region in the U. States and western Canada, where it was wont to wander in immense herds, but may now be considered as extinct in the wild state,



having been ruthlessly slaughtered. The two species closely resemble each other, the American bison, however, being for the most part smaller, and with shorter and weaker hind-quarters. The bison is remarkable for the great hump or projection over its fore-shoulders, at which point the adult male is almost six feet in height; and for the long, shaggy, rust-colored hair over the head, neck, and fore-part of the body. In summer, from the shoulders backward, the surface is covered with a very short hair, smooth and soft as velvet. The tail is short and tufted at the end. The American bison used to be much hunted for sport as well as for its flesh and skin. Its flesh is rather coarser grained than that of the domestic ox, but was considered by hunters and travelers as superior in tenderness and flavor. The hump is highly celebrated for its richness and delicacy. Their skins, especially that of the cow, dressed in the Indian fashion, with the hair on, make admirable defenses against the cold, and are known as buffalo robes; the wool has been manufactured into hats, and a coarse cloth. The American bison has been found to breed readily with the common ox, the issue being fertile among themselves.

**BISQUE** (bisk), a kind of unglazed white porcelain used for statuettes and ornaments.

**BIT'TERN**, the name of several grallatorial birds. There are two British species, the common bittern, and the little bittern, a native of the south, and only a summer visitor to Britain. Both, however, are becoming rare. The common bittern is about 28 inches in length, about 44 in extent of wing; general color, dull yellowish-brown, with spots and bars of black or dark brown; feathers on the breast long and loose; tail short; bill about 4 inches long. It is remarkable for its curious booming or bellowing cry. The eggs (greenish-brown) are four or five in number. The little bittern is not more than 15 inches in length. The American bittern has some resemblance to the common European bittern, but is smaller.

**BIT'TERN**, the syrupy residue from evaporated sea-water after the common salt has been taken out of it. It is used in the preparation of Epsom salt (sulphate of magnesia), of Glauber's salt (sulphate of soda), and contains also chloride of magnesium, iodine, and bromine.

**BITTER-NUT**, a tree of N. America, of the walnut order, or swamp-hickory, which produces small and somewhat egg-shaped fruits, with a thin fleshy rind; the kernel is bitter and uneatable.

**BITTER-ROOT**, a plant of Canada and part of the U. States, so called from its root being bitter though edible, and indeed esteemed as an article of food by whites as well as Indians. From the root, which is long, fleshy, and tapering, grow clusters of succulent green leaves, with a fleshy stalk bearing a solitary rose-colored flower rising in the center, and remaining open only in sunshine. Flower and leaves together, the plant appears above ground for only about six weeks.

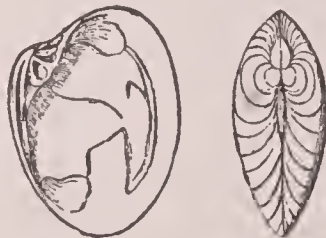
**BITTERS**, a liquor (frequently spirituous), in which bitter herbs or roots have been steeped. Gentian, quassia, angelica, bogbean, chamomile, hops, centaury, etc., are all used for preparations of this kind. The well-known Angostura bitters have aromatic as well as bitter properties.

**BITU'MEN**, a mineral substance of a resinous nature, composed principally of hydrogen and carbon, and appearing in a variety of forms which pass into each other and are known by different names, from naphtha, the most fluid, to petroleum and mineral tar, which are less so, thence to maltha or mineral pitch, which is more or less cohesive, and lastly to asphaltum and elastic bitumen (or elaterite), which are solid. It burns like pitch, with much smoke and flame. It consists of 84 to 88 of carbon and 12 to 16 of hydrogen, and is found in the earth, occurring principally in the secondary, tertiary, and alluvial formations. It is a very widely spread mineral, and is now largely employed in various ways. As the binding substance in mastics and cements it is used for making roofs, arches, walls, cellar-floors, etc., water-tight, for street and other pavements, and in some of its forms for fuel and for illuminating purposes. The bricks of which the walls of Babylon were built are said to have been cemented with bitumen, which gave them unusual solidity.

**BITUMINOUS COAL.** See Coal.

**BITUMINOUS SHALE**, or **SCHIST**, an argillaceous shale impregnated with bitumen and very common in the coal-measures. It is largely worked for the production of paraffin, etc.

**BI'VALVES**, molluscous animals having a shell consisting of two halves or



Bivalve shell.

valves that open by an elastic hinge and are closed by muscles; as the oyster, mussel, cockle, etc.

**BIVOUAC** (biv'u-ak), the encampment of soldiers in the open air without tents, each remaining dressed and with his weapons at hand. It was the regular practice of the French revolutionary armies, but is only desirable where great celerity of movement is required.

**BJORNSON**, Björnstjerne, a celebrated Norwegian poet, born at Kvikne in 1832. He first tried journalism, but that failing wrote in 1858 his first drama, *Between the Battles*, and also in that year his first novel, *Trust and Trial*. He became a theatrical manager in 1860, traveled much, was a leader of Norwegian republicans, and helped to carry the revolution of 1901. His poems chiefly celebrate the folk lore of Scandinavia, and his plays deal largely with so-called moral and social problems. In 1880 he visited the U. States, where he delivered a course of

lectures and was well received. His principal plays and novels have been translated into English.

**BLACK**, the negation of all color, the opposite of white. There are several black pigments, such as ivory-black, made from burned ivory or bones; lamp-black, from the smoke of resinous substance; Spanish-black, or cork-black, from burned cork, etc.

**BLACK**, Jeremiah Sullivan, an American jurist, born in Pennsylvania in 1810, admitted to the bar in 1831, and from 1842 to 1851 was judge of district courts in Pennsylvania. He was supreme court justice of Pennsylvania from 1851 to 1857, attorney-general in President Buchanan's cabinet, secretary of state in 1860, counsel for President Johnson in 1868, and counsel for Tilden before the electoral commission in the contest of Hayes's election in 1877. He died in 1883.

**BLACK**, William, novelist, born in Glasgow in 1841. His first novel, *Love or Marriage*, 1867, was only moderately successful, but his *In Silk Attire*, *Kilmeny*, *The Monarch of Mincing Lane*, and especially *A Daughter of Heth* (1871), gained him an increasingly wide circle of readers. He died in 1898. Other works: *The Strange Adventures of a Phaeton* (1872), *A Princess of Thule* (1873), *The Maid of Killeena*, etc. (1874), *Three Feathers* (1875), *Madcap Violet* (1876), *Green Pastures and Piccadilly* (1877), *Macleod of Dare* (1878), *White Wings* (1880), *Sunrise* (1881), *The Beautiful Wretch* (1882), *Shandon Bells* (1883), *Judith Shakespeare* (1884), *White Heather* (1885), *The Strange Adventures of a House-boat* (1888), *In Far Lochaber* (1889), *The New Prince Fortunatus* (1890), etc.

**BLACK-BEETLE**, a popular name for the cockroach.

**BLACK'BERRY**, a popular name of the bramble-berry or the plant itself.

**BLACK'BIRD**, called also the merle, a well-known species of thrush. It is larger than the common thrush, its length being about 11 inches. The color of the male is a uniform deep black, the bill being an orange-yellow; the female is of a brown color, with blackish-brown bill. The nest is usually in a thick bush, and is built of grass, roots,



The crow-blackbird.

twigs, etc., strengthened with clay. The eggs, generally four or five in number, are of a greenish-blue, spotted with various shades of brown. The song is rich, mellow, and flute-like, but of no great variety of compass. Its food is insects, worms, snails, fruits, etc. The



blackbirds or crow-blackbirds of America are quite different from the European blackbird, and are more nearly allied to the starlings and crows. See Crow-blackbird. The red-winged blackbird, belonging to the starling family, is a familiar American bird that congregates in great flocks.

**BLACKBURN**, a municipal county, and parliamentary borough of England, Lancashire, 21 miles n.n.w. from Manchester. Blackburn is one of the chief seats of the cotton manufacture, there being upward of 140 mills, as well as works for making cotton machinery and steam-engines. Pop. 127,527.

**BLACK DEATH.** See Plague.

**BLACK DRAUGHT**, sulphate of magnesia and infusion of senna, with aromatics to make it palatable.

**BLACKFEET INDIANS**, a tribe of American Indians, partly inhabiting the U. States, partly Canada, from the Yellowstone to Hudson's Bay.

**BLACKFISH**, a fish caught on the American coast, especially in the vicinity of Long Island, whence large supplies are obtained for the New York market. Its back and sides are of a



Blackfish.

bluish or crow black, the under parts, especially in the males, are white. It is plump in appearance, and much esteemed for the table, varying in size from 2 to 12 lbs.

**BLACK FOREST**, a chain of European mountains in Baden and Württemberg, running almost parallel with the Rhine for about 85 miles. The Danube, Neckar, Kinzig, and other streams, rise in the Black Forest, which is rather a chain of elevated plains than of isolated peaks; highest summit, Feldberg, 4900 feet. The skeleton of the chain is granite, its higher points covered with sandstone. The principal mineral is iron, and there are numerous mineral springs. The forests are extensive, chiefly of pines and similar species, and yield much timber. The manufacture of wooden clocks, toys, etc., is the most important industry, employing about 40,000 persons. The inhabitants of the forest are quaint and simple in their habits, and the whole district preserves its old legendary associations.

**BLACK FRIARS**, friars of the Dominican order; so called from their habit.

**BLACK FRIDAY**, the name given to Friday, Sept. 24, 1869, or Friday, Sept. 19, 1873, on both of which days Wall Street, New York, was stricken with money panics. The first panic was caused by the Fisk-Gould attempt to corner gold; the second was the financial smash which was part of the general panic of 1873.

**BLACK GUM**, an American tree, yielding a close-grained, useful wood; fruit a drupe of blue-black color, whence it seems to get its name of "black"; it has no gum about it. It is called also pepperidge, and has been introduced into Europe as an ornamental tree.

**BLACK HAWK**, a historic Indian, chief of the Sacs, who repudiated his father's sale of the land of the Sacs and Foxes east of the Mississippi and made war on the Americans in 1812. In 1830 Black Hawk opened war a second time and was defeated at the Wisconsin river by Dodge, July 21, 1832. On Aug. 1 he surrendered and was confined in Fortress Monroe until 1833. He died Oct. 18, 1838.

**BLACK HILLS**, a part of the Rocky Mountains Range in South Dakota. They cover a total area of about 6000 sq. miles, 1893 sq. miles of which have been set apart by the U. States government as a forest reserve. They are drained and nearly surrounded by the two main forks of the Cheyenne river. Their altitude ranges from between 2500 and 3000 feet at their base, to the summit of Harney Peak, 7216 feet in height. The mountains were formed by a local uplift, which raised the Archæan and later formations into a concentric fold. The Black Hills district was first partly explored in 1874 by an expedition under General Custer, when gold was discovered. In 1876, after some hostilities, a treaty made with the Sioux Indians opened the country to settlement, and Deadwood, Central City, Lead City, and other towns grew up very rapidly. The Black Hills constitute one of the richest gold-mining districts in the U. States.

**BLACK HOLE OF CALCUTTA**, a small chamber, 20 feet square, in the old fort of Calcutta, in which, after their capture by Surajah Dowlah, the whole garrison of 146 men were confined during the night of June 21, 1756. Only twenty-three survived. The spot is now marked by a monument.

**BLACKING**, for boots and shoes, etc., usually contains for its principal ingredients oil, vinegar, ivory or bone black, sugar or molasses, strong sulphuric acid, and sometimes caoutchouc and gum-arabic. It is used either liquid or in the form of paste, the only difference being that in making the paste a portion of the vinegar is withheld.

**BLACK LEAD.** See Graphite.

**BLACKLEG**, a disease which afflicts cattle, sheep, swine, and horses, but from which man is immune. It is caused by a germ which produces tumors in the muscles and various systemic symptoms which end almost always in death. It is chiefly prevalent in Kansas, Texas, Colorado, and South Dakota. Blackleg may be prevented by vaccination.

**BLACK-LETTER**, the name commonly given to the Gothic characters which began to supersede the Roman characters in the writings of western Europe toward the close of the 12th century. The first types were in black-letter, but these were gradually modified in Italy until they took the later Roman shape introduced into most European states during the 16th century.

**BLACKLIST**, a term applied to a number of persons who are deemed obnoxious by the maker of the list and against whom he warns his associates, and with whom he refuses to have any kind of business dealings, either as employer or trader. Black lists have

been used in almost every kind of business. The alleged black list of the railroads against those who took part in the Pullman and other strikes, and the notorious baseball black list of the baseball organizations under the famous "national agreement" of a few years ago, are notable instances of this process in the U. States.

**BLACKMAIL**, a certain rate of money, corn, cattle, or the like, anciently paid in the north of England and in Scotland, to certain men who were allied to robbers, to be protected by them from pillage. Blackmail was levied in the districts bordering the Highlands of Scotland till the middle of the 18th century.

The term now generally survives as the designation of an attempt to extort money, or other things, by threats, usually of exposure or calumny. In many states blackmail by written threat is deemed actionable.

**BLACKMORE**, Richard Doddridge, novelist, born at Longworth, Berkshire, 1825, died in 1900. His greatest success was *Lorna Doone*, a Romance of Exmoor (1869), one of the best of modern romances.

**BLACK MOUNTAINS**, the group which contains the highest summits of the Appalachian system, Clingman's Peak being 6701 feet, Guyot's Peak 6661. See Appalachian Mountains.

**BLACK SEA**, a sea situated between Europe and Asia, and mainly bounded by the Russian and Turkish dominions, being connected with the Mediterranean by the Bosphorus, Sea of Marmora, and Dardanelles, and by the Strait of Kertsch with the Sea of Azov, which is, in fact, only a bay of the Black Sea; area of the Black Sea and the Sea of Azov about 175,000 square miles, with a depth in the center of more than 150 fathoms and few shoals along its shores. The water is not so clear as that of the Mediterranean, and is less salt on account of the many large rivers which fall into it—the Danube, Dniester, Dnieper, Don, etc. Though not tidal, there are strong currents. The tempests on it are very violent, as the land which confines its agitated waters gives to them a kind of whirling motion, and in the winter it is scarcely navigable. During January and February the shores from Odessa to the Crimea are ice-bound. It contains few islands, and those of small extent. The most important ports are those of Odessa, Kherson, Nicolaiev, Sebastopol, Batum, Trebizond, Samsun, Sinope, and Varna.

**BLACKSNAKE**, a common snake reaching a length of 5 or 6 feet, and so agile and swift as to have been named the racer, with no poison fangs, and therefore comparatively harmless. It feeds on small quadrupeds, birds, and the like, and is especially useful in killing rats.

**BLACKSTONE**, Sir William, an eminent jurist, born in London in 1723; educated at the Charter House and Pembroke College, Oxford. In 1743 he was elected fellow of All-Souls College, Oxford, and in 1746 was called to the bar; but, having attended the Westminster law-courts for seven years without success, he retired to Oxford.



Here he gave lectures on law, which suggested to Mr. Viner the idea of founding a professorship at Oxford for the study of the common law; and Blackstone was in 1758 chosen the first Vinerian professor. In 1761 he was elected M.P. for Hindon, made king's counsel and solicitor-general to the queen. In 1765 he published the first volume of his famous Commentaries on the Laws of England, the other three volumes being produced at intervals during the next four years. Its merits as an exposition made it for a long period the principal text-book of English law. In 1770 he was knighted and made one of the justices of Common Pleas, continuing in office until his death in 1780.

**BLACKTAIL**, an American deer, so called because of its black tail. Similar in its general characters to the mule deer, it occupies the coast region from central California to Alaska. Its color is brown-gray mottled with black, and it has a black stripe along the spine.

**BLACK TIN**, tin ore when dressed, stamped, and washed ready for smelting, forming a black powder.

**BLACK VOMIT**, the dark substance thrown up in yellow fever; hence a name of this disease.

**BLACK WADD**, an ore of manganese, used as a drying ingredient in paints.

**BLACKWELL**, Elizabeth, the first woman who ever obtained the degree of M.D. She was born in England in 1821, and settled in America with her parents in 1831. After numerous difficulties she was admitted into the College of Geneva, N. Y., and graduated M.D. in 1849.

**BLADDER**, Urinary, a musculo-membranous bag or pouch present in all Mammalia, destined to receive and retain for a time the urine which is secreted by the kidneys. It occupies the anterior and median portion of the pelvis, and in the male of the human subject is situated behind the pubis and above and in front of the rectum; in the female above and in front of the vagina and uterus. The urine secreted by the kidneys is conveyed into this reservoir by means of two tubes called the ureters, which open near the neck or lower part of the bladder in an oblique direction, by which means they prevent the reflux of the urine. When empty it forms a rounded, slightly conoid mass about the size of a small hen's egg. As it gradually fills with urine its walls become distended in all directions except in front, and it then rises above the pelvis proper into the abdomen. It is held in its place by two lateral ligaments, one on each side, and an anterior ligament. The contents are carried off by the urethra, which, as well as the neck of the bladder, is surrounded by a structure called the prostate gland.

**BLADDERWORT**, the common name of slender aquatic plants, species of which are natives of Britain, the United States, etc., growing in ditches and pools. They are named from having little bladders or vesicles, that fill with air at the time of flowering and raise the plant in the water, so that the blossoms expand above the surface.

**BLAINE**, James Gillespie, American statesman, born 1830. He entered

Washington College, Pa., at the age of thirteen, graduated in 1847, studied law, acted as a teacher, and then having gone to Augusta, Maine, was for several years newspaper editor. He was sent to congress by Maine as a republican in 1862, and was repeatedly reelected. He was several times speaker of the House of Representatives. In 1876 he entered the senate; in 1884 he was nominated for the presidency, but was defeated by Mr. Cleveland. In 1884 appeared the first volume of his Twenty Years of Congress, a work which has had a very favorable reception. He died in January, 1893.

**BLAIR**, Francis Preston, an American politician and writer, born in 1791, at Abingdon, Va., died 1876. He supported Abraham Lincoln for the presidency and took part in the famous peace conference at Hampton Roads, Feb. 3, 1865.

**BLAIR**, Francis Preston, an American statesman, soldier and jurist, born in Lexington, Ky., in 1821, died 1875. He settled in St. Louis, took the federal side during the civil war, after which he became a democrat and was candidate for vice-president in 1868.

**BLAIR**, John Insley, an American philanthropist, born in New Jersey in 1802, died 1899. He founded Blair Hall at Princeton University and gave large endowments to other schools and colleges. He was one of the builders of the Delaware, Lackawanna & Western Railroad.

**BLAIR**, Montgomery, an American jurist and statesman, born in Kentucky in 1813, died 1883. He settled in St. Louis, and was counsel for the defendant in the famous Dred Scott case. He was postmaster-general in Lincoln's cabinet and introduced the money-order system in the American postal service. He subsequently joined the democratic party and was a supporter of Tilden in the Tilden-Hayes controversy.

**BLAKE**, Eli Whitney, an American inventor, born at New Haven, Conn., in 1795, died in 1836. His principal invention was the famous stone-crusher called by his name.

**BLAKE**, Lillie Devereaux, an American reformer, born at Raleigh, N. C., in 1835. She became known as a novelist in the early sixties and for 20 years, until 1890, served as president of the New York State Woman's Suffrage Association. She is also known as a most capable lecturer.

**BLAKE**, Robert, a celebrated British admiral, was born at Bridgewater in 1599, died at the entrance of Plymouth Sound 1657. He was elected member for Bridgewater in the parliament of 1640. This being soon dissolved he lost his election for the next, and sought to advance the parliamentary cause in a military capacity in the war which then broke out. He soon distinguished himself, and in 1649 he was sent to command the fleet with Colonels Deane and Popham. His greatest achievements were in the Dutch war which broke out in 1652. In November, 1654, he was sent with a strong fleet to enforce a due respect to the British flag in the Mediterranean. He sailed first to Algiers, which submitted, and then demolished

the castles of Goletta and Porto Ferino, at Tunis, because the dey refused to deliver up the British captives. A squadron of his ships also blocked up Cadiz, and intercepted a Spanish Plate



Admiral Blake.

fleet. In April, 1657, he sailed with twenty-four ships to Santa Cruz, in Teneriffe; and, notwithstanding the strength of the place, burned the ships of another Spanish Plate fleet which had taken shelter there, and by a fortunate change of wind came out without loss.

**BLAKE**, William, mystic artist and poet, author of many exquisite lyrics, and of designs mainly allegorical or symbolical, was the son of a London hosier, and was born in 1757. Failing to find a publisher for his work Songs of Innocence, he invented a process by which he was both printer and illustrator of his own poems. Some of his best-known works are: Gates of Paradise, Book of Thel, Marriage of Heaven and Hell, Songs of Experience, Book of Urizen, Song of Los, Book of Ahania, etc. He died in 1828.

**BLANCHARD**, Thomas, an American inventor, born in 1788, died in 1864. His principal inventions were a tack-making machine, a lathe for turning gun-barrels, and several contrivances for steamboat navigation.

**BLANCHE OF CASTILE**, daughter of Alphonso IX., queen of Louis VIII., king of France, and mother of St. Louis, born 1187, died 1252 or 1253. On the death of Louis VIII. she procured the coronation of her son, and during his minority held the reins of government in his name with distinguished success. In 1244, when St. Louis left for the Holy Land, she again became regent, and gave new proofs of her abilities and firmness as a ruler.

**BLANC - MANGE** (blé-mānz'), in cookery, a name of different preparations of the consistency of a jelly, variously composed of dissolved isinglass, arrow-root, maize-flour, etc., with milk and flavoring substances.

**BLAND**, Richard Parks, an American statesman, born in Kentucky in 1835, died in 1899. He settled in Missouri. He served as congressman from that state from 1872 till his death. He was an ardent supporter of the silver movement, and introduced the celebrated Bland Act of 1878 for the coinage of silver. In 1896 he was a prominent



candidate for the presidential nomination at the Chicago convention.

**BLANKET**, a woolen covering for the bed or for the person. Blanket manufacture in the U. States has grown vastly since the war of 1812, and the industry is chiefly in New England. Excellent blankets are made by the natives of India, and also by the N. American Indians. In recent years the industry has grown considerably in California and Oregon.

**BLANK VERSE**, verse without rhyme, first introduced into English poetry (from the Italian) by the Earl of Surrey. The most common form of English blank verse is the decasyllabic, such as that of Milton's *Paradise Lost*, or of the dramas of Shakespeare. From Shakespeare's time it has been the kind of verse almost universally used by dramatic writers, who often employ an additional syllable, making the lines not strictly decasyllabic. The first use of the term blank verse is said to be in *Hamlet*, ii. 2: "The lady shall say her mind freely, or the blank verse shall halt for't." The term is not applied to the Anglo-Saxon and Early English alliterative unrhymed verse.

**BLARNEY**, a village in Ireland, 4 miles n.w. of the city of Cork, with Blarney Castle in its vicinity. A stone called the Blarney Stone, near the top of the castle, is said to confer on those who kiss it the peculiar kind of persuasive eloquence alleged to be characteristic of the natives of Ireland.

**BLASPHEMY** is the denying of the existence of God, assigning to him false attributes, or denying his true attributes; contumelious reproaches of our Savior; profane scoffing at the Holy Scriptures, or exposing them to ridicule and contempt. In Catholic countries it also includes the speaking contemptuously or disrespectfully of the Holy Virgin or the saints.

**BLAST-FURNACE**, the name given to the common smelting-furnace used for obtaining iron from its ores with the aid of a powerful blast of air. This air-blast, which is propelled by a powerful blowing-engine and is now invariably heated to a high temperature (600° to 900° F.), is injected by pipes called tuyeres, situated as shown at A in the annexed vertical section, in the lowest part of the furnace, near to the hearth B. The conical part C next above the hearth is termed the boshes, and the interior is continued upward, sometimes, as in the annexed cut, in a tapered body or cone D, sometimes as a perpendicular cylinder, which is surmounted by an opening for the introduction of the materials from an external gallery F. The exterior consists of massive masonry of stone or firebrick, the body part being lined with two shells of firebricks separated by a thin space to allow for expansion, this space being generally filled with sand, ground fire-clay, or the like, to hinder the radiation of heat to the outside. When the body rises in the form of a perpendicular cylinder it is called the barrel. The cone or barrel is sometimes clasped round on the outside by numerous strong iron hoops, or is cased with iron plates fastened to the masonry by iron

bolts. The boshes C are lined with firebrick or firestone, and the hearth B is built with large blocks of refractory stone. The charging of the furnace goes on all day and night, one charge consisting of a barrow-load of coal and



Section of blast furnace.

a barrow-load of ore, char, and lime, the last mineral acting as a flux. These charges are constantly passing downward and undergoing a change as they come nearer the hotter parts of the furnace. Toward the lower part the earthy matter of the ore unites with the limestone and forms a slag, which finally escapes at an opening below the tuyeres, and the molten metal drops down and fills the lower part at B, to be drawn off at stated periods. This is done usually twice in the twenty-four hours by means of a round hole called a tap. The furnace is constantly kept filled to within about 2 feet of the top. The ore put in at the top takes about thirty-six hours before it comes out as iron. Hematite yields on an average about 55 per cent of metal, and black-band about 40 to 50. In the newer forms of furnaces the top is closed, and the gases formerly burned at the top are conveyed by pipes G to be utilized as fuel in heating the blast and in raising steam for the blowing-engine. The principle adopted is to close the top by a bell-and-cone arrangement E, which is opened and shut at pleasure by hydraulic or other machinery. The height of furnaces varies from 50 to 80, and even in some cases to upward of 100 feet, and the greatest width is about one-third of this.

**BLASTING**, the operation of breaking up masses of stone or rock in situ by means of gunpowder or other explosive. In ordinary operations holes are bored into the rock from 1 to 6 inches in diameter, by means of a steel-pointed drill, by striking it with hammers or allowing it to fall from a height. After the hole is bored to the requisite depth it is cleaned out, the explosive is introduced, the hole is "tamped" or filled up

with broken stone, clay, or sand, and the charge exploded by means of a fuse or by electricity. In larger operations mines or shafts of considerable diameter take the place of the holes above described. Shafts are sunk from the top of the rock to various depths, sometimes upward of 60 feet. This shaft joins a heading, or gallery, driven in from the face, if possible along a natural joint; and from this point other galleries are driven some distance in various directions, with headings at intervals, returning toward the face of the rock and terminating in chambers for the charges. Enormous charges are frequently made use of, upward of twenty tons of gunpowder having been fired in a single blast. One of the greatest blasting operations ever attempted was the removal of the reefs in the East River, near New York, known as Hellgate. An entrance-shaft was sunk on the Long Island shore, from which the reef projected. From this shaft nearly twenty tunnels were bored in all directions, extending from 200 to 240 feet, and connected by lateral galleries. Upward of 52,000 lbs. of dynamite, rend-rock, and powder were used, and millions of tons of rock were dislodged. Numerous important improvements have been made in blasting by the substitution of rock-boring machines for hand labor. Of such machines, in which the "jumper" or drill is repeatedly driven against the rock by compressed air or steam, being also made to rotate slightly at each blow, there are many varieties.

**BLATCHFORD**, Samuel, an American jurist, born in 1820 at New York City, died in 1893. In 1882 he was appointed an associate justice of the United States Supreme court, and served in that capacity until his death.

**BLEACHING**, the act or art of freeing textile fibers and fabrics and various other substances (such as materials for paper, ivory, wax, oils) from their natural color, and rendering them perfectly white, or nearly so. The ancient method of bleaching by exposing the fabrics, etc., to the action of the sun's rays, and frequently wetting them, has been nearly superseded, at least where the business is carried on on the large scale, more complicated processes in connection with powerful chemical preparations being now employed. Among the latter the chief are chlorine and sulphurous acid, the latter being employed more especially in the case of animal fibers (silk and wool), while cotton, flax, and other vegetable fibers are operated upon with chlorine, the bleaching in both cases being preceded by certain cleansing processes. The use of chlorine as a bleaching agent was first proposed by Berthollet in 1786, and shortly afterward introduced into Great Britain, where it was first used simply dissolved in water, afterward dissolved in alkali, and then in the form of bleaching-powder, commonly called chloride of lime. In modern calico bleaching the preliminary process is singeing by passing the fabric over red-hot plates or through a gas-flame to remove the downy pile and short threads from the surface of the cloth. The goods next pass to the liming process.



when they are uniformly and thoroughly impregnated with a supersaturated solution of lime. The next process is the bowking or boiling for several hours, after which they are washed. They are then soured by being passed through a solution of hydrochloric acid for the purpose of dissolving any traces of free lime which may have been left in the washing, and to decompose the calcareous soap formed by the bowking process. After boiling in kiers with a solution of soda-ash and rosin and another washing, the cloth is ready for the processes of chemicking or liquoring with bleaching-powder, and white-souring with a very dilute sulphuric acid. Another thorough washing concludes the operations of bleaching proper, after which the cloth goes through various finishing processes. Modifications of the same processes are adopted in bleaching linen, wool, silk, etc.

**BLEACHING-POWDER**, chloride of lime, made by exposing slaked lime to the action of chlorine. It is regarded as a double salt of the chloride of calcium and hypochlorite of calcium. It is much used as a disinfectant, besides its use in bleaching.

**BLenheim DOG**, a variety of spaniel, bearing a close resemblance to the King Charles breed, but somewhat smaller, so named from having been originally bred by one of the Dukes of Marlborough. It has a short muzzle, long silky hair without any curl, and long pendulous ears.

**BLen'NERHAS'SET**, Harman, a large Anglo-American land-owner and emigrant who became noted for his association with the Aaron Burr conspiracy. He was born in England in 1764 and died in 1831. Coming to America in 1797 he settled in Virginia, and soon grew very rich, subsequently becoming a cotton planter in Mississippi. His wife, née Adeline Agnew, published several novels which were popular in her day.

**BLESSING**, or **BENEDICTION**, a prayer or solemn wish imploring happiness upon another; a certain holy action which, combined with prayer, seeks for God's grace for persons, and, in a lower degree, a blessing upon things, with a view whether to their efficiency or safety. The lifting up of the hands is an inseparable adjunct of the act of blessing. In the Roman Catholic Church the sign of the cross is made, and the thumb and the two first fingers of the right hand are extended, the two remaining fingers turned down. In the Greek Church the thumb and the third finger of the same hand are conjoined, the other fingers being stretched out. Some see in this position a representation of the sacred monogram in Greek letters of our Lord's name.—In the English liturgy there are two blessings or benedictions; in the service of the Scotch Church there is only one.

**BLESSINGTON**, Margaret, Countess of, was born near Clonmel, Ireland, 1789, died at Paris 1849. At the age of fifteen she married Captain Farmer, who died in 1817; and a few months after his death married Charles John Gardiner, earl of Blessington. In 1822 they went abroad, and continued to

reside on the Continent till the earl's death in 1829, when Lady Blessington took up her abode in Gore House, Kensington. Her residence became the fashionable resort for all the celebrities of the time. She contributed to the *New Monthly Magazine*, *Conversations with Lord Byron*; wrote numerous novels, including *The Belle of a Season*, *The Two Friends*, *Strathern*, and the *Victims of Society*; and acted as editress for several years of *Heath's Book of Beauty*, the *Keepsake*, and the *Gems of Beauty*.

**BLIGHT**, a generic name commonly applied to denote the effects of disease or any other circumstance which causes plants to wither or decay. It has been vaguely applied to almost every disease of plants whether caused by the condition of the atmosphere or of the soil, the attacks of insects, parasitic fungi, etc. The term is frequently limited to disease in cereal crops.

**BLIND**, a screen of some sort to prevent too strong a light from shining in at a window, or to keep people from seeing in. Venetian blinds are made of slats of wood, so connected as to overlap each other when closed, and to show a series of open spaces for the admission of light and air when in the other position.

**BLIND**, The, those who want, or are deficient in, the sense of sight. Blindness may vary in degree from the slightest impairment of vision to total loss of sight; it may also be temporary or permanent. It is caused by defect, disease, or injury to the eye, to the optic nerve, or to that part of the brain connected with it. Old age is sometimes accompanied with blindness, occasioned by the drying up of the humors of the eye, or by the opacity of the cornea, the crystalline lens, etc. There are several causes which produce blindness from birth. Sometimes the eyelids adhere to each other, or to the eyeball itself, or a membrane covers the eyes; sometimes the pupil of the eye is closed, or adheres to the cornea, or is not situated in the right place, so that the rays of light do not fall in the middle of the eye; besides other defects. The blind are often distinguished for a remarkable mental activity, and a wonderful development of the intellectual powers. Their touch and hearing, particularly, become very acute.

There are now comparatively few large cities that do not possess a school or institution of some kind for the blind. The occupations in which the blind are found capable of engaging are such as the making of baskets and other kinds of wicker-work, brushmaking, rope and twine making, the making of mats and matting, knitting, netting, fancy work of various kinds, cutting fire-wood, the sewing of sacks and bags, the carving of articles in wood, etc. Piano-tuning is also successfully carried on by some, and the cleaning of clocks and watches has even been occasionally practiced by them.

Various systems have been devised for the purpose of teaching the blind to read, some of which consist in the use of the ordinary Roman alphabet, with more or less modification, and some of

which employ types quite arbitrary in form.

**BLIND-FISH**, the name of several species of fish, inhabiting the American cave-streams. They are all small, the largest not exceeding five inches. In the typical species, of the Mammoth Cave of Kentucky, the eyes are reduced to a useless rudiment hidden under the skin, the body is translucent and colorless, and the head and body are covered with numerous rows of sensitive papillæ, which form very delicate organs of touch.

**BLIND TOM**, a celebrated musical prodigy. He was born in 1850 near Columbus, Ga., and his performances on the piano were incredible. He could repeat, after a single hearing, exceedingly complex compositions. He was exhibited for many years, but his mental infirmities finally caused his withdrawal. He was perfectly blind, and almost idiotic. Of late he is said to have lived in New York City. Died in 1908.

**BLISS**, Cornelius Newton, an American merchant and politician, born at Fall River, Mass., in 1833. He has been chairman of the republican state committee of New York and treasurer of the republican national committee for several terms. In President McKinley's cabinet he was secretary of the interior.

**BLISTER**, a topical application which, when applied to the skin, raises the cuticle in the form of a vesicle, filled with serous fluid, and so produces a counter-irritation. The Spanish fly-blister operates with most certainty and expedition, and is commonly used for this purpose, as well as mustard, hartshorn, etc.

**BLIZ'ZARD**, a fierce storm of frosty wind with fine powdery snow, occurring in some parts of N. America and often causing loss of life through suffocation and cold.

**BLOCK**, a mechanical contrivance consisting of one or more grooved pulleys mounted in a casing or shell which is furnished with a hook, eye, or strap, by which it may be attached to an object, the function of the apparatus being to transmit power or change the direction of motion by means of a rope or chain passing round the movable pulleys. Blocks are single, double, treble, or fourfold, according as the number of sheaves or pulleys is one, two, three, or four. A running block is attached to the object to be raised or moved; a standing block is fixed to some permanent support. Blocks also receive different denominations from their shape, purpose, and mode of application. They are sometimes made of iron as well as of wood. Blocks to which the name of dead-eyes has been given are not pulleys, being unprovided with sheaves.

**BLOCKADE**, is the rendering of intercourse with the seaports of an enemy unlawful on the part of neutrals, and it consists essentially in the presence of a sufficient naval force to make such intercourse difficult. It must be declared or made public, so that neutrals may have notice of it. If a blockade is instituted by a sufficient authority, and maintained by a sufficient force, a neutral is so far affected by it that an



attempt to trade with the place invested subjects vessel and cargo to confiscation by the blockading power. The term is also used to describe the state of matters when hostile forces sit down around a place and keep possession of all the means of access to it, so as to cut off entirely its communication with the outside world, and so compel surrender from want of supplies.

**BLOCK-BOOKS**, before and for a short time after the invention of printing, books printed from wooden blocks each the size of a page and having the matter to be reproduced, whether text or picture, cut in relief on the surface.

**BLOCKHOUSE**, a fortified edifice of one or more stories, constructed chiefly of blocks of hewn timber. Blockhouses are supplied with loopholes for musketry (*aa*) and sometimes with em-



Block-house.

brasures for cannon, and when of more than one story the upper ones are made to overhang those below, and are furnished with machicolations or loopholes in the overhung floor, so that a perpendicular fire can be directed against the enemy in close attack. Blockhouses are often of great advantage, and in wooded localities readily constructed.

**BLOCK-SYSTEM**, a system of working the traffic on railways according to which the line is divided into sections of 3 or 4 miles, each section generally stretching from one station to the next, with a signal and telegraphic connection at the end of each section. The essential principle of the system is that no train is allowed to enter upon any one section till the section is signaled wholly clear, so that between two successive trains there is not merely an interval of time, but also an interval of space.

**BLOCK-TIN**, tin at a certain stage of refinement, but not quite pure.

**BLOIS** (blwä), capital of the French dep. Loir-et-Cher, 99 miles s.s.w. Paris,



Court of the Castle of Blois.

on the Loire. The castle was long occupied by the counts of the name; and became a favorite residence of the kings of France. Louis XII. was born, Francis I., Henry II., Charles IX., and

Henry III. held their courts in it Pop. 21,077.

**BLOOD**, the fluid which circulates through the arteries and veins of the human body and that of other animals, which is essential to the preservation of life and nutrition of the tissues. This fluid is more or less red in vertebrates, except in the lowest fishes. In insects and in others of the lower animals there is an analogous fluid which may be colorless, red, bluish, greenish, or milky. The venous blood of mammals is a dark red, but in passing through the lungs it becomes oxidized and acquires a bright scarlet color, so that the blood in the arteries is of a brighter hue than that in the veins. The central organ of the blood circulation is the heart (which see). The specific gravity of human blood varies from 1.045 to 1.075, and its normal temperature is 99° Fahr. 1000 parts contain 783.37 of water, 2.83 fibrin, 67.25 albumen, 126.31 blood corpuscles, 5.16 fatty matters, 15.08 various animal matters and salts. When ordinary blood stands for a time it separates into two portions, a red coagulated mass consisting of the fibrin, corpuscles, etc., and a yellowish watery portion, the serum. The blood corpuscles or globules are characteristic of the fluid. These are minute red and white bodies floating in the fluid of the blood. The red ones give color to the fluid, and are flattish discs, oval in birds and reptiles, and round in man and most mammals. In man they average  $\frac{1}{2500}$ th inch in diameter, and in the Proteus, which has them larger than any other vertebrate,  $\frac{1}{100}$ th inch in length and  $\frac{1}{12}$ th in breadth. The white or colorless corpuscles are the same as the lymph or chyle corpuscles, and are spherical or lenticular, nucleated, and granulated, and rather larger than the red globules. See Harvey William.

**BLOOD**, Avenger of, in Scripture, the nearest relation of any one that had died by manslaughter or murder, so called because it fell to him to punish the person who was guilty of the deed.

**BLOOD FEUD**, the right of private vengeance for injuries done by violence. The feud is generally found a legal or acknowledged right in primitive societies only. The right passes to the nearest of kin to the injured or murdered person. It persists today in Corsica and other places, and in the U. States it is practiced by the mountaineers of Kentucky.

**BLOODHOUND**, a variety of dog with long smooth and pendulous ears, remarkable for the acuteness of its smell, and employed to recover game or prey which has escaped wounded from the hunter, by tracing the lost animal by the blood it has spilt: whence the name of the dog. There are several varieties of this animal, as the English, the Cuban, and the African bloodhound. In some places bloodhounds have not only been trained to the pursuit of game, but also to the chase of man. In America they used to be employed in hunting fugitives slaves.

**BLOOD-LETTING**. See Phlebotomy.

**BLOOD-RAIN**, showers of grayish and reddish dust mingled with rain which occasionally fall usually in the zone of

the earth which extends on both sides of the Mediterranean westwardly over the Atlantic, and eastwardly to central Asia. The dust is largely made up of microscopic organisms, especially the shells of diatoms; the red color being owing to the presence of a red oxide of iron.



Blood-hound.

**BLOODROOT**, a plant of Canada and the U. States, belonging to the poppy order, and so named from its root-stock yielding a sap of a deep orange color. Its leaves are heart-shaped and deeply lobed, the flower grows on a scape and is white or tinged with rose. The plant has acrid narcotic properties, and has been found useful in various diseases. *Geum canadense*, another American plant used as a mild tonic, is also known as bloodroot.

**BLOOD-STAINS**, the stains left by blood, and of importance in criminal trials. Until recently it was impossible positively to identify a blood-stain, old or new, as human blood, because the crystals formed by chemical tests are indistinguishable as between man and some other animals. A positive test, however, has recently been discovered. The stain is extracted with a double strength of salt solution and filtered. Small quantities of human blood are then injected daily for six days into the peritoneal cavity of a rabbit. Some of the rabbit's serum is then added to the clear filtrate of the suspected blood, and if the latter be human a light flocculent precipitate will fall.

**BLOOD-VESSELS** are the tubes or vessels in which the blood circulates. See Arteries, Veins, Heart.

**BLOODY ASSIZES**, those held by Judge Jeffreys in 1685, after the suppression of Monmouth's rebellion. Upward of 300 persons were executed after short trials; very many were whipped, imprisoned, and fined; and nearly 1000 were sent as slaves to the American plantations.

**BLOODY MARY**, a name given to Queen Mary of England, daughter of Henry VIII., whose reign from 1553 to 1558 was marked by persecution of the Protestants.

**BLOODY TOWER**, a name given to the tower in the Tower of London, in which Richard III. had murdered the young sons of Edward IV.

**BLOOMER**, Amelia Jenks, the inventor of the bloomer costume for women. She was a native of New York, born in 1818, died in 1894. She was a general reformer and temperance advocate. See Bloomers.

**BLOOMER COSTUME**, a style of dress adopted about the year 1849 by Mrs. Bloomer, of New York, who proposed



thereby to effect a complete revolution in female dress, and add materially to the health and comfort of women. It consisted of a jacket with close sleeves, a skirt reaching a little below the knee, and a pair of Turkish pantaloons secured by bands round the ankles. See Bloomer, Amelia Jenks.

**BLOOMFIELD-ZEISLER**, Fanny, an American pianist, born in Austria in 1866. She was educated in Chicago and abroad and made her first appearance in 1883. She ranks among the greatest of living pianists.

**BLOOMINGTON**, a thriving city, in the state of Illinois, 60 miles n.e. of Springfield. It has several important educational institutions, including the Illinois Wesleyan University, a college for women, and the state Normal University in the vicinity. Has coal-mines, iron industries, railway works, etc., and a large trade. Pop. 24,000.

**BLOUSE** (blouz), a light loose upper garment, resembling a smock-frock, made of linen or cotton, and worn by men as a protection from dust or in place of a coat. A blue linen blouse is the common dress of French workmen.

**BLOW-FLY**, a name for a species of two-winged flies that deposit their eggs on flesh, and thus taint it.

**BLOWING-MACHINE**, any contrivance for supplying a current of air, as for blowing glass, smelting iron, renewing the air in confined spaces, and the like. This may consist of a single pair of bellows, but more generally two pairs are combined to secure continuity of current. The most perfect blowing-machines are those in which the blast is produced by the motion of pistons in a cylinder, or by some application of the fan principle. For smelting and refining furnaces, where a blast with a pressure of 3 or 4 lbs. to the square inch is required, blowing-engines of large size and power, worked by steam, are employed.

**BLOW-PIPE**, an instrument by which a current of air or gas is driven through the flame of a lamp, candle, or gas jet, and that flame directed upon a mineral substance, to fuse or vitrify it, an in-



Blow-pipe.—a, Ball to catch moisture from the mouth.

tense heat being created by the rapid supply of oxygen and the concentration of the flame upon a small area. In its simplest form it is merely a conical tube of brass, glass, or other substance, usually 7 inches long and  $\frac{3}{4}$  inch in diameter at one end, and tapering so as to have a very small aperture at the other, within 2 inches or so of which it is bent nearly to a right angle, so that the stream of air may be directed sideways to the operator. The flame is turned to a horizontal direction, assumes a conical shape, and consists of two parts of different colors. The greatest heat is obtained at the tip of the inner blue flame. Here the substance subjected to it is burned or oxidized, a small piece of lead or copper, for instance, being converted into its oxide. Hence the

name of the oxidizing flame. By shifting the substance to the interior blue flame, which is wanting in oxygen, this element will be abstracted from the substance, and a metallic oxide, for instance, will give out its metal; hence this is called a reducing flame. The blow-pipe is largely used in the manufacture of glass, jewelry, and other commodities.

**BLUBBER**, the fat of whales and other large sea animals, from which train-oil is obtained. The blubber lies under the skin and over the muscular flesh. It is eaten by the Eskimo and the sea-coast races of the Japanese islands, the Kuriles, etc. The whole quantity yielded by one whale ordinarily amounts to 40 or 50, but sometimes to 80 or more cwts.

**BLUCHER** (blü'her), Gebhard Leberecht von, distinguished Prussian general, born at Rostock 1742, died at Krieblowitz, in Silesia, 1819. He entered the Swedish service when fourteen



Blücher.

years of age and fought against the Prussians, but was taken prisoner in his first campaign, and was induced to enter the Prussian service. He became a major in 1793 and in 1794 major-general of the army of observation. After the Peace of Tilsit he labored in the department of war at Königsberg and Berlin. He then received the chief military command in Pomerania, but at the instigation of Napoleon was afterward, with several other distinguished men, dismissed from the service. In the campaign of 1812, when the Prussians assisted the French, he took no part; but no sooner did Prussia rise against her oppressors than Blücher, then seventy years old, engaged in the cause with all his former activity, and was appointed commander-in-chief of the Prussians and the Russian corps under General Winzingerode. His heroism in the battle of Lützen (May 2, 1813) was rewarded by the Emperor Alexander with the order of St. George. The battles of Bautzen and Hanau, those on the Katzbach and Leipzig, added to his glory. He was now raised to the rank of field-marshal, and led the Prussian army which invaded France early in 1814. After a period of obstinate conflict the day of Montmartre crowned this campaign, and, March 31, Blücher entered the capital of France. His king, in remembrance of the victory which he had gained at the Katzbach, created him Prince of Wahlstadt, and gave him an estate in Silesia. On the renewal of

the war in 1815 the chief command was again committed to him, and he led his army into the Netherlands. June 15 Napoleon threw himself upon him, and Blücher, on the 16th, was defeated at Ligny. In the battle of the 18th Blücher arrived at the most decisive moment upon the ground, and taking Napoleon in the rear and flank assisted materially in completing the great victory of Waterloo. He was a rough and fearless soldier, noted for his energy and rapid movements, which had procured him the name of "Marshal Vorwärts" (Forward).

**BLUE**, one of the seven colors into which the rays of light divide themselves when refracted through a glass prism, seen in nature in the clear expanse of the heavens; also a dye or pigment of this hue. The substances used as blue pigments are of very different natures, and derived from various sources; they are all compound bodies, some being natural and others artificial. They are derived almost entirely from the vegetable and mineral kingdoms.

**BLUEBEARD**, the hero of a well-known tale, originally French, founded, it is believed, on the enormities of a real personage, Gilles de Laval, Count de Retz, a great nobleman of Brittany, put to death for his crimes in 1440.

**BLUEBELL**, a name given to the wild hyacinth and to the harebell.

**BLUEBERRY**, an American species of whortleberry.

**BLUEBIRD**, a small bird, very common in the U. States. The upper part of the body is blue, and the throat and breast of a dirty red. It makes its nest in the hole of a tree or in the box that is so commonly provided for its use by the friendly farmer. The bluebird is the harbinger of spring; its song is cheer-



The bluebird.

ful, continuing with little interruption from March to October, but is most frequently heard in the serene days of the spring. It is also called blue robin or blue redbreast, and is regarded with the same sort of sentiments as the robin of Europe.

**BLUE-BOOKS**, the official reports, papers, and documents printed for the British government and laid before the Houses of Parliament. They are so called simply from being stitched up in dark-blue paper wrappers, and include bills presented to and acts passed by the houses; all reports and papers moved for by members or granted by government on particular subjects; the reports of committees; statistics of the trade, etc., of the country and of the colonies; and ambassadorial and consular reports from foreign countries and ports.

**BLUE-BOTTLE FLY**, a large blue species of blow-fly.



**BLUEFISH**, a species of sea-fish widely distributed on the U. States coasts and highly prized as an article of diet. The size of the fish varies from 3 to 25 pounds, 10 pounds being considered a heavy fish. The color is greenish or bluish. The production of bluefish runs up into millions of pounds annually.

**BLUE-GRASS**, a species of grass of the same order as meadow grass. It is common in the U. States, Europe, and Asia. It grows to its greatest perfection in Kentucky and Tennessee and is often called, for that reason, Kentucky bluegrass.

**BLUE-GRASS REGION**, a part of Kentucky famous for its excellent pastures of blue-grass and its fine horses.

**BLUE LAWS**, a term applied to certain Puritan enactments, particularly in Connecticut, and concerned with Sabbath breaking. The term is now generally applied to any stringent laws of religious or moral force.

**BLUE LIGHT**, a brilliant light used for signaling at sea. It is produced by the ignition of a fine powder composed principally of antimony. For that reason the fumes of the combustion are poisonous when inhaled in considerable quantity.

**BLUE RIDGE**, the most easterly ridge of the Alleghany or Appalachian Mountains. The most elevated summits are the peaks of Otter (4000 feet) in Virginia.

**BLUESTOCKING**, a literary lady: applied usually with the imputation of pedantry. The term arose in connection with certain meetings held by ladies in the days of Dr. Johnson for conversation with distinguished literary men. One of these literati was a Mr. Benjamin Stillington, who always wore blue stockings, and whose conversation at these meetings was so much prized that his absence at any time was felt to be a great loss, so that the remark became common, "We can do nothing without the blue stockings"; hence these meetings were sportively called blue-stockings clubs, and the ladies who attended them blue-stockings.

**BLUEWING**, a genus of American ducks, so called from the color of the wing-coverts. One species is brought in great quantities to market, the flesh being highly esteemed for its flavor.

**BLUFFS**, the name in America for the steep banks of a stream or lake forming prominent headlands, and often extending inland as plateau.

**BLUNDERBUSS**, a short gun with a very wide bore, capable of holding a number of slugs or bullets, and intended to do execution at a limited range without exact aim.

**BLUSHING**, a physiological process by which the blood flows in larger quantities to certain parts of the body, as the breast, face, and neck. It is customarily produced by some mental shock, as of shame, modesty, chagrin, etc., and its connection with the brain is not understood. It is known, however, that such mental shocks cause a sudden dilation of the small blood-vessels in the parts mentioned.

**BOA**, a genus of serpents having the jaws so constructed that these animals

can dilate the mouth sufficiently to swallow bodies thicker than themselves. They are also distinguished by having a hook on each side of the vent; the tail prehensile; the body compressed and largest in the middle, and with small scales, at least on the posterior part of the head. The genus includes some of the largest species of serpents, reptiles endowed with immense muscular power. They seize sheep, deer, etc., and crush them in their folds, after which they swallow the animal whole. The boas are peculiar to the hot parts of S. America. The Boa constrictor is not one of the largest members of the genus, rarely exceeding 20 feet in length; but the name boa or boa constrictor is often given popularly to any of the large serpents of similar habits, and so as to include the Pythons of the Old World and the Anaconda and other large serpents of America.

**BOADICEA**, Queen of the Iceni, in Britain, during the reign of Nero. Having been treated in the most ignominious manner by the Romans, she headed a general insurrection of the Britons, attacked the Roman settlements, reduced London to ashes, and put to the sword all strangers to the number of 70,000. Suetonius, the Roman general, defeated her in a decisive battle (A.D. 62), and Boadicea, rather than fall into the hands of her enemies, put an end to her own life by poison.

**BOAR**, the male of swine not castrated. See Hog.

**BOARD**, a number of persons having the management, direction, or superintendence of some public or private office or trust; often an office under the control of an executive government, the business of which is conducted by officers specially appointed for that purpose.

**BOARD OF EDUCATION**, a department of a city government which has control of primary, secondary, and high school education.

**BOARD OF TRADE**. See Trade, Board of.

**BOARDING-HOUSE**, a private business concern which feeds and lodges guests but which differs from a hotel or inn because the proprietor reserves the right to reject applicants for keep. The keeper is responsible for the goods of his guest and in common law has no lien for debt on those goods.

**BOAT**, a small open vessel or water craft usually moved by oars or rowing. The forms, dimensions, and uses of boats are very various, and some of them carry a light sail. Large vessels, whether ships of war or merchantmen, carry with them a number of boats; and since steam has become so common as a propelling power, it has also been employed in ships' boats. A ship of war has now usually several large boats propelled by steam, with others that are rowed, as a barge, pinnace, yawl, cutter, jolly-boat, and gig.

**BOATSWAIN** (commonly pronounced bō'sn), a warrant-officer in the navy who has charge of the sails, rigging, colors, anchors, cables, and cordage. His office is also to summon the crew to their duty, to relieve the watch, etc. In the merchant service one of

the crew who has charge of the rigging and oversees the men.

**BOB'BIN**, a reel or other similar contrivance for holding thread. It is often a cylindrical piece of wood with a head, on which thread is wound for making lace; or a spool with a head at one or both ends, intended to have thread or yarn wound on it, and used in spinning machinery (when it is slipped on a spindle and revolves therewith) and in sewing-machines (applied within the shuttle).

**BOBBINET**, a machine-made cotton net, originally imitated from the lace made by means of a pillow and bobbins.

**BOBOLINK**, one of the most interesting song-birds of North America, found wherever plains, prairie meadows, or cultivated fields offer it a suitable home. The length is about 7 inches, of



The bobolink.

which 2½ inches go to the tail; the spring or breeding plumage of the adult male is black, with the hindhead and nape, scapulars, rump, and upper tail-coverts buff, inclining to ochraceous on the neck and ashy toward the tail; the female is protectively denied this gay suit, and is clothed in neutral yellowish brown, much streaked; and the young of both sexes wear a similar dress until the males mature. The female constructs on the ground a nest of grasses in which are laid four or five eggs, dull white, flecked and marbled with Vandyke brown, upon which she sits very closely for about a fortnight.

During the nuptial season—from May until mid-July—the male is driving from the vicinity every intruder he can frighten away, especially rivals of his own kind.

**BOBRUISK**, a fortified town of Russia, gov. Minsk. Pop. 58,056.

**BOCCACCIO** (bok-kāt'chō), Giovanni, Italian novelist and poet, was born 1313, in Certaldo, died there 1375. In 1341 Boccaccio fell in love with Maria, an illegitimate daughter of King Robert, who returned his passion with equal



ardor, and was immortalized as Fiammetta in many of his best creations. In 1344 he returned to Naples, where Giovanna, the granddaughter of Robert, who had succeeded to the throne, received him with distinction. Between 1344 and 1350 most of the stories of the Decameron were composed at her desire or at that of Fiammetta. This work, on which his fame rests, consists of 100 tales represented to have been related in equal portions in ten days by a party of ladies and gentlemen at a country house near Florence while the plague was raging in that city. The stories in this wonderful collection range from the highest pathos to the coarsest licentiousness. On the death of his father Boccaccio returned to Florence, where he was greatly honored, and was sent on several public embassies. Among others he was sent to Padua to communicate to Petrarch the tidings of his recall from exile and the restoration of his property. From this time an intimate friendship grew up between them which continued for life. They both contributed greatly to the revival of the study of classical literature. In 1373 he was chosen by the Florentines to occupy the chair which was established for the exposition of Dante's *Divina Commedia*. His lectures continued till his death.

**BOCHUM** (boh'um), a Prussian town, prov. of Westphalia, 5 miles e.n.e. of Essen; manufactories of iron, steel, hardware, etc. Pop. 65,554

**BOCK, BOCKBIER**, a variety of German beer made with more malt and less hops than ordinary German beer, and therefore sweeter and stronger.

**BODLEIAN LIBRARY** at Oxford, founded by Sir Thomas Bodley in 1598, opened 1602. It claims a copy of all works published in Britain, and for rare works and MSS. it is said to be second only to the Vatican. It contains about 500,000 books.

**BODLEY**, Sir Thomas, the founder of the Bodleian Library at Oxford, was born at Exeter in 1544, died in London 1612. He was educated partly at Geneva, whither his parents, who were Protestants, had retired in the reign of Queen Mary. On the accession of Elizabeth they returned home, and he completed his studies at Magdalen College, Oxford. He traveled much on the Continent, and was employed in various embassies to Denmark, Germany, France, and Holland. In 1597 he returned home, and dedicated the remainder of his life to the reestablishment and augmentation of the public library at Oxford. He expended a very large sum in collecting rare and valuable books, besides leaving an estate for the support of the library. He was knighted at the accession of James I.

**BODY-SNATCHING**, an ancient practice in vogue previous to the recognition by law of the science of anatomy and the legal provision of material for dissection. Body-snatching, or grave-robbing, is a general offense in common law, no matter what may be the purpose of the theft. It is seldom practiced nowadays except in the commission of crime. Jerry Cruncher, in

Dickens's *Tale of Two Cities*, was a professional body-snatcher.

**BŒOTIA**, a division of ancient Greece, lying between Attica and Phocis, had an area of 1119 sq. miles. The whole country is surrounded by mountains. The country originally had a superabundance of water, but artificial drainage works made it one of the most fertile districts of Greece. The inhabitants were of the Æolian race, most of the towns formed a kind of republic, of which Thebes was the chief city. Epaminondas and Pelopidas raised Thebes for a time to the highest rank among Grecian states. Refinement and cultivation of mind never made such progress in Bœtia as in Attica, and the term Bœotian was used by the Athenians as a synonym for dulness, but somewhat unjustly, since Hesiod, Pindar, the poetess Corinna, and Plutarch were Bœotians. Bœotia now forms a nomarchy of the kingdom of Greece, with a population of 57,091; capital, Livadia.

**BOERS** (bōrz), the farmers of Dutch origin in South Africa. In 1836-37 many Boers, being dissatisfied with the British government in Cape Colony, migrated beyond the Orange river, and a number found their way to what is now Natal. Here there had been British settlements for some years, and the British formally annexed the country in 1843. Subsequently the Boers were allowed to establish the Orange Free State as an independent republic, and several other small republics, which finally were combined into one—the South African Republic, or Transvaal. In 1877 the Transvaal was annexed by Britain, according to the wish of many of the people, but war broke out in 1880, British forces suffered more than one defeat, and in 1881 the country was accorded a modified independence. Henceforth it was a common feeling among the Boers that they and not the British must be predominant in South Africa, and in October, 1899, after an insolent ultimatum, the united forces of the Transvaal and Orange State invaded Natal. The war which followed with Britain was concluded by the final surrender of the Boers in May, 1902; the two states having been declared British territory in 1900. See Transvaal, Natal, etc.

**BOG**, a piece of wet, soft, and spongy ground, where the soil is composed mainly of decaying and decayed vegetable matter. Such ground is valueless for agriculture until reclaimed, but often yields abundance of peat for fuel.

**BOGAR'DUS**, James, an American inventor, born in 1800, died in 1874. Among his inventions were the "ring-flyer" or "ring-spinner" used in cotton manufacture (1828), the eccentric mill (1829), an engraving machine (1831), and the first dry gas-meter (1832). In 1839 he gained the reward offered for the best plan for carrying out the penny postage system by the use of stamps. In 1847 he built the first complete cast-iron structure in the world, and the first wrought-iron beams were made from his design. His delicate pyrometer and deep-sea sounding machine were valuable additions to scientific instruments.

**BOGOTA'**, a city of South America, capital of Colombia and of the state or department of Cundinamarca, and seat of an archbishopric, situated on an elevated plain 8863 feet above the sea, at the foot of two lofty mountains, with a healthful though moist climate, and a temperature rarely exceeding 59° Fahr. Bogota being subject to earthquakes, the houses are low, and strongly built of sun-dried brick. The inhabitants are mostly Creoles. Bogota is an emporium of internal trade, and has manufactures of soap, cloth, leather, etc., not of great importance. It was founded in 1538. Pop. about 100,000.

**BO'GUS**, an Americanism meaning counterfeit, and applied to any spurious or counterfeit object; as, a bogus government, a bogus law. The origin of the term is uncertain.

**BOHE'MIA**, a province with the title of kingdom belonging to the Austro-Hungarian monarchy, bounded by Bavaria, Saxony, the Prussian province of Silesia, Moravia, and the archduchy of Austria; area, 20,223 sq. miles; pop. 6,318,280, of whom more than 2,000,000 are Germans, the rest mostly Czechs. The prevailing religion is the Roman Catholic, the country being an archbishopric with three bishoprics. The language of the country is the Czech dialect of the Slavonic (see Czech language); in some districts, and in most of the cities, German is spoken. Bohemia is surrounded on all sides by mountains, and has many large forests. The chief rivers are the Elbe and its tributary the Moldau, which is even larger. All sorts of grain are produced in abundance, as also large quantities of potatoes, pulse, sugar-beet, flax, hops (the best in Europe), and fruits. The raising of sheep, horses, swine, and poultry is carried on to a considerable extent. The mines yield silver, copper, lead, tin, zinc, iron, cobalt, arsenic, uranium, antimony, alum, sulphur, plumbago, and coal. There are numerous mineral springs, but little salt. Spinning and weaving of linen, cotton, and woollen goods are extensively carried on; manufactures of lace, metal, and wood work, machinery, chemical products, beet-root sugar, pottery, porcelain, etc., are also largely developed. Large quantities of beer (Pilsener) are exported. The glassware of Bohemia, which is known all over Europe, employs 50,000 workers. The trade, partly transit, is extensive, Prague, the capital, being the center of it. The largest towns are Prague, Pilsen, Reichenberg, Budweis, Teplitz, Aussig, and Eger. The educational establishments include the Prague University and upward of 4000 ordinary schools. The province sends 92 representatives to the Austrian parliament; the provincial diet consists of 241 members.

Bohemia was named after a tribe of Gallic origin, the Boii, who were expelled from this region by the Marcomans at the commencement of the Christian era. The latter were in turn obliged to give place to the Germans, and these to the Czechs, a Slavic race who had established themselves in Bohemia by the middle of the 5th century, and still form the bulk of the population. The country



was at first divided into numerous principalities. Christianity was introduced about 900. In 1092 Bohemia was finally recognized as a kingdom under Wratlas II. In 1230 the monarchy, hitherto elective, became hereditary. The monarchs received investiture from the German emperor, held one of the great offices in the imperial court, and were recognized as among the seven electors of the empire. Frequently at strife with its neighbors, Bohemia was successively united and disunited with Hungary, Silesia, Moravia, etc., according to the course of wars and alliances.

**BOIES**, Horace, an American statesman, born in New York in 1827. He settled in Iowa and was elected governor of that state in 1889 and 1891. He is well known for his opposition to protective tariff.

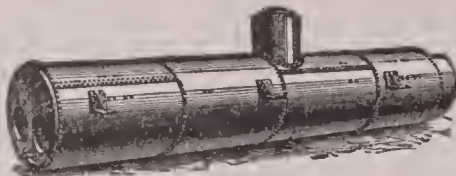
**BOIL**, to heat a fluid up to the point at which it is converted into vapor. The conversion takes place chiefly at the point of contact with the source of heat, and the bubbles of vapor rising to the surface, and breaking there, produce the commotion called ebullition. At the ordinary atmospheric pressure ebullition commences at a temperature which is definite for each liquid. The escape of the heated fluid in the form of vapor prevents any further rise of temperature in an open vessel when the boiling-point has been reached. The exact definition of the boiling-point of a liquid is "that temperature at which the tension of its vapor exactly balances the pressure of the atmosphere." The influence of this pressure appears from experiments. In an exhausted receiver the heat of the human hand is sufficient to make water boil; while, on the contrary, in Papin's digester, in which it is possible to subject the water in the boiler to a pressure of three or four atmospheres, the water may be heated far above the normal boiling-point without giving signs of ebullition. From this relation between the ebullition of a liquid and atmospheric pressure the heights of objects above sea-level may be calculated by comparing the actual boiling-point at any place with the normal boiling-point. (See Heights, Measurement of.) The boiling-point of water as marked on Fahrenheit's thermometer is 212°; on the Centigrade, 100°; on the Réaumur, 80°. Ether boils at about 96°, mercury at 662°.

**BOIL**, a small painful swelling of a conical shape on the surface of the body. Its base is hard, while its apex is soft and of a whitish color. Boils are generally indicative of depressed health, intemperate habits, or disorder of the digestive organs.

**BOILER**, a vessel constructed of wrought iron or steel plates riveted together, with needful adjuncts, in which steam is generated from water for the purpose of driving a steam-engine, or for other purposes.

The shell of the boiler, or outer part, is of iron or steel plates. The steam chest or dome, on the upper side of the boiler, is a reservoir, whence the steam is supplied to the engine by the steam-pipe, which is fitted with a stop-valve. The furnace is the chamber for the combustion of the fuel. The flues or con-

duits for the burnt gases are either external or internal; cylindrical metal flues are flue-tubes, and they are fixed at the ends into tube-plates. The man-hole is the entrance to the boiler for inspection, etc.; and it is closed by a manhole door or lid. Mudholes are placed at or near the bottom of the



Double-flue boiler.

boiler, for the discharge of sediment, etc. The water is supplied by the feed-apparatus; its level is indicated by a float. The water-gauge also shows the level of the water; it may be a glass tube at the front of the boiler, connected to it by two horizontal tubes, one at the upper end and one at the lower end of the glass tube; or it may be a series of two or three gauge-cocks, connected at different levels. The boiler is emptied by the blow-off cock; the surface of the water is cleared by the scum-cock. Brine-pumps may be used instead of blow-off cocks to draw off the brine from marine boilers. Surplus steam escapes by the safety-valves. Vacuum valves admit air into the boiler, when the pressure is less than that of the atmosphere. Fusible plugs are inserted in the boiler, over the fire, which melt and give vent to the steam when the pressure and temperature of the steam in the boiler become excessive and dangerous. The degree of pressure is indicated by the pressure-gauge. The boiler is strengthened by stays, which may consist of rods, bolts, or gussets. The boiler is covered with clothing or clead-ing. The fire-grate carries the fuel, and it consists of grate-bars or fire-bars, usually of cast-iron, supported by cross-bearers or bar-frames. The mouthpiece is the entrance to the furnace, and it rests on the dead-plate. The fire-door or pair of fire-doors are fitted to and hung by it. The heating surface is the surface of the boiler exposed to the flame and burned gases from the furnace.

Boilers are of two types: shell boilers, consisting of a large shell, usually cylindrical with flat ends, containing the water and steam, so that the whole of the shell is exposed to the full pressure of the steam; and water-tube boilers, in which the water flows through a large number of tubes of small diameter, while the products of combustion flow over the outsides of the tubes.

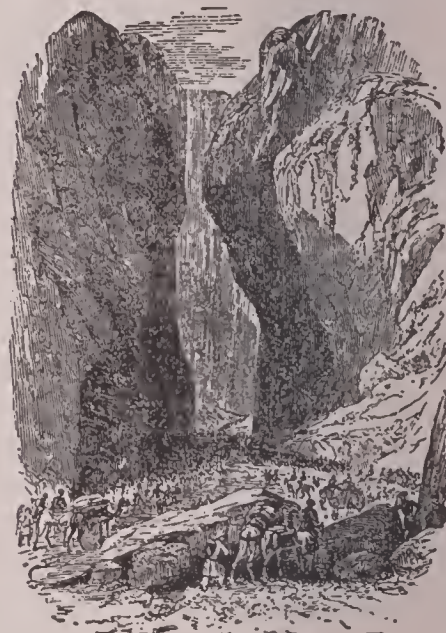
**BOISE CITY**, capital of the state of Idaho. Pop. 5957.

**BOJOL** (bo-hol'), one of the Philippine Islands, north of Mindanao, about 40 miles by 30 miles. Woody and mountainous. Pop. 187,000.

**BOKHARA**, **BOCHARA**, (bo-hä'rá), a khanate of central Asia, vassal to Russia, bounded north by Russian Turkestan, west by Khiva and the Transcaspian Territory of Russia, south by Afghanistan, and east by Chinese Turkestan; area about 93,000 square miles. The country in the west is to a

great extent occupied by deserts; in the east are numerous ranges of mountains. Cultivation is mainly confined to the valleys of the rivers. The climate is warm in summer, but severe in winter; there is very little rain, and artificial irrigation is necessary. Besides cereals, cotton and tobacco are cultivated, and also a good deal of fruit. The total population, about 2,000,000.—Bokhara, the capital of the khanate, is 8 or 9 miles in circuit, and is surrounded by a mud wall. Pop. 70,000.

**BOLAN' PASS**, a celebrated defile in the Hala Mountains, n.e. of Beluchistan, on the route between the Lower Indus (Scinde) and the tableland of Afghanistan. It is about 60 miles long, hemmed in on all sides by lofty precipices, and



In the Bolan pass.

in parts so narrow that a regiment could defend it against an army. It is traversed by the Bolan river. The crest of the pass is 5800 feet high.

**BOLAS**, a form of missile used by the Paraguay Indians, the Patagonians, and especially by the Gauchos of the Argentine Republic. It consists of a rope or line having at either end a stone, ball of metal, or lump of hardened clay. When used it is swung round the head by one end, and then hurled at an animal so as to entangle it.

**BOLER'O**, a popular Spanish dance of the ballet class for couples, or for a single female dancer. The music, which is in triple measure, is generally marked by rapid changes of time, and the dancers mostly accompany the music with castanets. The interest of these dances largely depends upon the pantomime of passion, which forms an essential part of them.

**BOLEYN** (bul'in), Anne, second wife of Henry VIII. of England, eldest daughter of Sir Thomas Boleyn and Elizabeth Howard, daughter of the Duke of Norfolk; born, according to some accounts, in 1507, but more probably about 1501. She attended Mary, sister of Henry, on her marriage with Louis XII., to France, as lady of honor, returning to England about 1522, and becoming lady of honor to Queen



Catherine. The king, who soon grew passionately enamored of her, without waiting for the official completion of his divorce from Catherine, married Anne in January, 1533, having previously created her Marchioness of Pembroke. When her pregnancy revealed the secret, Cranmer declared the first marriage void and the second valid, and Anne was crowned at Westminster with



Anne Boleyn.

unparalleled splendor. On Sept. 7, 1533, she became the mother of Elizabeth. She was speedily, however, in turn supplanted by her own lady of honor, Jane Seymour. Suspicions of infidelity were alleged against her, and in 1536 the queen was brought before a jury of peers on a charge of treason and adultery. Smeaton, a musician, who was arrested with others, confessed that he had enjoyed her favors, and on May 17 she was condemned to death. The clemency of Henry went no further than the substitution of the scaffold for the stake, and she was beheaded on May 19, 1536. Whether she was guilty or not has never been decided; that she was exceedingly indiscreet is certain.

**BO'LINGBROKE**, Henry St. John, Viscount, English statesman and political writer, born in 1678 at Battersea, London; educated at Eton and at Oxford, where he had a reputation both for ability and libertinism. In 1700 he married a considerable heiress, the daughter of Sir Henry Winchcomb, but they speedily separated. In 1701 he obtained a seat in the House of Commons, attaching himself to Harley and the Tories. He at once gained influence and became secretary of war in 1706, though he retired with the ministry in 1708. He continued, however, to maintain a constant intercourse with the queen, who preferred him to her other counselors, and on the overthrow of the Whig ministry in 1710, after the Sacheverell episode, he became one of the secretaries of state. In 1712 he was called to the House of Lords by the title of Viscount Bolingbroke, and in 1713, against much popular opposition, concluded the Peace of Utrecht. Queen Anne, provoked by Oxford, dismissed him, and made Bolingbroke prime minister, but died herself four days later. Bolingbroke, dismissed by King George while yet in Germany, fled to France in March, 1715, to escape the inevitable impeachment by which, in

the autumn of that year, he was deprived of his peerage and banished. In 1723 he was permitted to return to England. In 1735 a return to France became prudent, if not necessary. In 1742, on the fall of Walpole, he came back in the expectation that his allies would admit him to some share of power; but, being disappointed in this respect, he withdrew entirely from politics and spent the last nine years of his life in quietude at Battersea, dying in 1751. He was clever and versatile, but unscrupulous and insincere.

**BOLIVAR** (bo-lé'vār), Simon, the liberator of Spanish South America, was born at Caracas, July 24, 1783. He finished his education in Europe, and having then joined the patriotic party among his countrymen he shared in the first unsuccessful efforts to throw off the Spanish yoke. In 1812 he joined the patriots of New Granada in their struggle, and having defeated the Spaniards in several actions he led a small force into his own country (Venezuela), and entered the capital, Caracas, as victor and liberator, Aug. 4, 1813. But the success of the revolutionary party was not of long duration. Bolivar was beaten by General Boves, and before the end of the year the royalists were again masters of Venezuela. Bolivar next received from the Congress of New Granada the command of an expedition against Bogota, and after the successful transfer of the seat of government to that city retired to Jamaica. Having again returned to Venezuela he was able to rout the royalists under Morillo, and, after a brilliant campaign, effected in 1819 a junction with the forces of the New Granada republic. The battle of Boyaca which followed gave him possession of Santa Fé and all New Granada, of which he was appointed president and captain-general. A law was now passed by which the Republics of Venezuela and New Granada were to be united in a single state, as the Republic of Colombia; and Bolivar was elected the first president. In 1822 he went to the aid of Peru, and was made dictator, an office held by him till 1825, by which time the country had been completely freed from Spanish rule. In 1825 he visited Upper Peru, which formed itself into an independent republic named Bolivia, in honor of Bolivar. In Colombia a civil war arose between his adherents and the faction opposed to him, but Bolivar was confirmed in the presidency in 1826, and again in 1828, and continued to exercise the chief authority until May, 1830, when he resigned. He died at Carthagena on the 17th December, 1830.—One of the departments of Colombia is named after him, as are also a state of the republic Venezuela, and the town Ciudad Bolivar.

**BOLIVIA**, formerly called Upper Peru, a republic of South America, bounded n. and e. by Brazil, s. by the Argentine Republic and Paraguay, and w. by Peru and Chile. Estimates of its area vary from 471,788 to 800,000 sq. miles. The total pop. is about 2,300,000. An unascertained proportion of the inhabitants belong to aboriginal races (the Aymaras and the Quichuas); the larger portion of the remainder be-

ing Mestizos or descendants of the original settlers by native women. The largest town is La Paz, but the executive government has its seat at Sucre or Chuquisaca; other towns are Potosi, Oruro, and Cochabamba. The broadest part of the Andes, where these mountains, encompassing Lakes Titicaca (partly in Bolivia) and Aullagas, divide into two chains, known as the Eastern and Western Cordilleras, lies in the western portion of the state. Here are some of the highest summits of the Andes, as Sorata, Illimani, and Sajama. The two chains inclose an extensive tableland, the general elevation of which is about 12,500 feet, much of it being saline and barren, especially in the south.

The climate, though ranging between extremes of heat and cold, is very healthful, and cholera and yellow fever are unknown. The elevated regions are cold and dry, the middle temperate and delightful, the lower valleys and plains quite tropical. Among animals are the llama, alpaca, vicuña, chinchilla, etc.; the largest bird is the condor. Bolivia has long been famed for its mineral wealth, especially silver and gold. The celebrated Potosi was once the richest silver district in the world. The country is capable of producing every product known to South America, but cultivation is in a very backward state. Coffee, coca, cacao, tobacco, maize, and sugarcane are grown, and there is an inexhaustible supply of india-rubber. The chief exports are silver (two-thirds of the whole) cinchona or Peruvian bark, cocoa, coffee, caoutchouc, alpaca wool, copper, tin, and other ores.

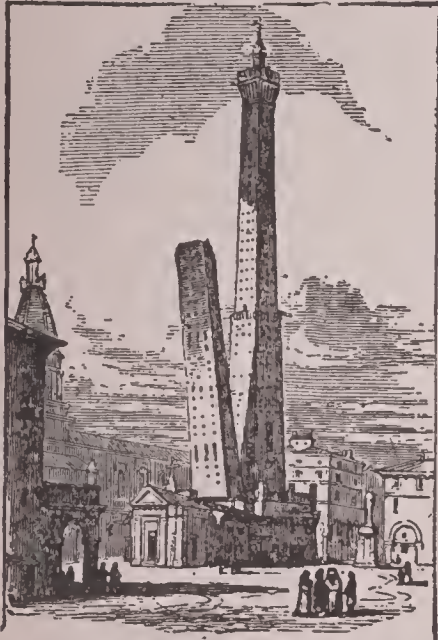
By its constitution Bolivia is a democratic republic. The executive power is in the hands of a president elected for four years, and the legislative belongs to a congress of two chambers, both elected by universal suffrage. The religion is the Roman Catholic, and public worship according to the rites of any other church is prohibited. Education is at an exceedingly low ebb.

Bolivia under the Spaniards long formed part of the viceroyalty of Peru, latterly it was joined to that of La Plata or Buenos Ayres. Its independent history commences with the year 1825, when the republic was founded. The constitution was drawn up by Bolivar, in whose honor the state was named Bolivia; and was adopted by congress in 1826. It has since undergone important modifications. But the country has been almost continually distracted by internal and external troubles, and can scarcely be said to have had any definite constitution.

**BOLOGNA** (bo-lōn'yá), one of the oldest, largest, and richest cities of Italy, capital of the province of same name, in a fertile plain at the foot of the Apennines, between the rivers Reno and Savena, surrounded by an unfortified brick wall. It is the see of an archbishop, and has extensive manufactures of silk goods, velvet, artificial flowers, etc. The leaning towers Degli Asinelli and Garisenda, dating from the 12th century, are among the most remarkable objects in the city; and the market is adorned with the colossal



bronze Neptune of Giovanni da Bologna. An arcade of 640 arches leads to the church of Madonna di S. Lucca, situated at the foot of the Apennines, near Bologna, and the resort of pilgrims from all parts of Italy. Bologna has long been renowned for its university, claiming to have been founded in 1088, and having a library, at one time in the care of Cardinal Mezzofanti, which



The Asinelli and Garisenda towers, Bologna.

numbers over 200,000 volumes and 9000 MSS. The Instituto delle Scienze has a library which numbers about 160,000 volumes, with 6000 manuscripts. The Church of San Domenico has a library of 120,000 volumes. The Academy of Fine Arts has a rich collection of paintings by native artists, such as Francia, and the later Bolognese school, of which the Caraccis, Guido Reni, Domenichino, and Albano were the founders.—Bologna was founded by the Etruscans under the name of Felsina; became in 189 B.C. the Roman colony Bononia; was taken by the Longobards about 728 A.D.; passed into the hands of the Franks, and was made a free city by Charlemagne. In the 12th and 13th centuries it was one of the most flourishing of the Italian republics; but the feuds between the different parties of the nobles led to its submission to the papal see in 1513. Several attempts were made to throw off the papal yoke, one of which, in 1831, was for a time successful. In 1849 the Austrians obtained possession of it. In 1860 it was annexed to the dominions of King Victor Emmanuel. Pop. 130,000.—The province of Bologna, formerly included in the papal territories, forms a rich and beautiful tract; area, 1390 sq. miles; pop. 527,000.

**BOLOM'ETER**, a most sensitive electrical instrument that is employed for the measurement of radiant heat.

**BOLSTER**, a nautical term applied to a piece of wood covered with canvas upon which rests the topmost rigging to prevent injury to the rigging.

**BOLT**, a piece of metal used to bind machinery together, or to fasten, temporarily or permanently, any kind of

structure. The manufacture of bolts requires very complicated machinery, especially bolts to which are attached nuts to hold the bolt in place. Various kinds of bolts are called eye-bolts, through-bolts, blunt-bolts, Lewis bolts, track-bolts (for railroad track), etc.

**BOLTING-CLOTH**, a fabric of silk used in the manufacture of flour to separate the fine parts of the product from the coarse.

**BOLTON**, a large manufacturing town and municipal, parli., and county borough of Lancashire, England, lying 10 miles n.w. from Manchester, and consisting mainly of two divisions, Great Bolton and Little Bolton, separated from each other by the river Croal. In manufacturing industries it is now surpassed by few places in Britain, and it contains some of the largest and finest cotton-mills in the world. There are large engineering works, besides collieries, paper-mills, foundries, chemical works, etc. Pop. 168,205.

**BOMB** (bom), a large, hollow iron ball or shell, filled with explosive material and fired from a mortar. The charge in the bomb is exploded by means of a fuse filled with powder and other inflammable materials, which are ignited by the discharge of the mortar. Conical shells shot from rifled cannon have largely supplanted the older bomb. The use of bombs and mortars is said to have been invented in the middle of the 15th century.

**BOM'BARD**, a kind of cannon or mortar formerly in use, generally loaded with stone instead of iron balls. Hence the term bombardier.

**BOMBARDIER** (-dēr'), an artillery soldier whose special duties are connected with the loading and firing of shells, grenades, etc., from mortars or howitzers.

**BOMBARDIER BEETLE**, a name given to beetles of the family Carabidæ, because of the remarkable power they possess of being able to defend themselves by expelling from the anus a pungent acrid fluid, which explodes with a pretty loud report on coming in contact with the air.

**BOMBARD'MENT**, an attack with bombs or shells upon a fortress, town, or any position held by an enemy, generally carried out from the sea.

**BOMBAR'DON**, a large musical instrument of the trumpet kind, in tone not unlike an ophicleide. Its compass is from F on the fourth ledger-line below the bass-staff to the lower D of the treble-staff. It is not capable of rapid execution.

**BOMBASIN**. See Bombazine.

**BOMBAY'**, chief seaport on the west coast of India, and capital of the presidency of the same name, stands at the southern extremity of the island of Bombay. Bombay has many handsome buildings, both public and private, as the cathedral, the university, the secretariat, the new high court, the post and telegraph offices, etc. Various industries, such as dyeing, tanning, and metal working, are carried on, and there are large cotton factories. The commerce is very extensive. The harbor is one of the largest and safest in India, and there are commodious docks. There

is a large traffic with steam-vessels between Bombay and Great Britain, regular steam communication with China, Australia, Singapore, Mauritius, etc. The island of Bombay is about 11 miles long and 3 miles broad. After Madras, Bombay is the oldest of the British possessions in the East, having been ceded by the Portuguese in 1661. Pop. 776,006.



Bombardon.

**BOMBAY'**, one of the three presidencies of British India, between lat. 14° and 29° n., and lon. 66° and 77° e. It stretches along the west of the Indian peninsula, and is irregular in its outline and surface, presenting mountainous tracts, low barren hills, valleys, and high tablelands. It is divided into a northern, a central, and a southern division, the Sind division, and the town and island of Bombay. The



northern division contains the districts of Ahmedabad, Kaira, Panch Mahals, Broach, Surat, Thana, Kolaba; the central, Khandesh, Nasik, Ahmednagar, Poona, Sholapur, Satara; the southern, Belgaum, Dharwar, Kaladgi, Kanara, Ratnagiri. Total area, 123,064 sq. miles; pop. 18,559,561, including the city and territory of Aden in Arabia, 80 sq. miles (pop. 43,974). The native or



feudatory states connected with the presidency (the chief being Kathiawar) have an area of 65,761 sq. miles and a pop. of 6,908,648. The Portuguese possessions Goa, Daman, and Diu geographically belong to it. Many parts, the valleys in particular, are fertile and highly cultivated; other districts are being gradually developed by the construction of roads and railroads. The southern portions are well supplied with moisture, but a great part of Sind is the most arid portion of India. The climate varies, being unhealthful in the capital Bombay and its vicinity, but at other places, such as Poonah, very favorable to Europeans. The chief productions of the soil are cotton, rice, millet, wheat, barley, dates, and the cocoa-palm. The manufactures are cotton, silk, leather, etc. The great export is cotton. The administration is in the hands of a governor and council.

**BOMBAZINE** (-zên') is a mixed tissue of silk and worsted, the first forming the warp and the second the weft. It is fine and light in the make, and may be of any color, though black is now most in use.

**BOMB-PROOF**, a quality of fortification which enables the fortification to resist injury from bombs or shells cast upon it. Gibraltar, cut from the solid rock, and certain forts of exceedingly massive walls are bomb-proof.

**BONA FIDES, BONA FIDE** (fī'dēz, fī'dē), a term derived from the Roman jurists, implying the absence of all fraud or unfair dealing.

**BONAN'ZA**, a term applied in the U. States to an abundance of precious metal or rich ore in a mine.

**BONAPARTE** (bon'a-pärt), the French form which the great Napoleon was the first to give to the original Italian name Buonaparte, borne by his family in Corsica.

**BONAPARTE**, Jerome, youngest brother of Napoleon I., was born at Ajaccio in 1784. In 1801 he was sent out on an expedition to the West Indies, but the vessel being chased by English cruisers, was obliged to put into New York. During his sojourn in America Jerome Bonaparte became acquainted with Miss Elizabeth Patterson, of Baltimore, and though still a minor, married her in spite of the protests of the French consul on 24th December, 1803. The emperor, his brother, after an ineffectual application to Pope Pius VII. to have it dissolved, issued a decree declaring it to be null and void. After considerable services both in the army and navy, in 1807 he was created King of Westphalia, and married Catherine Sophia, princess of Würtemberg. After the election of his nephew, Louis Napoleon, to the presidency of the French Republic, in 1848, he became successively governor-general of Les Invalides, a marshal of France, and president of the senate. He died in 1860. Of the three children that were born to Jerome Bonaparte from his second marriage one was Prince Napoleon Joseph, who assumed the name of Jerome, and was well known by the nickname "Plon-Plon." He died in 1891, having married Clotilde, daughter of King Victor

Emmanuel of Italy. He had three children: Victor (born 18th July, 1862), Louis, and Marie Letitia. The first of these, since the death of Napoleon III.'s son, the Prince Imperial, is generally recognized by the Bonapartist party as the heir to the traditions of the dynasty. He had to leave France in 1886, a law being passed expelling pretenders to the French throne and their eldest sons.

**BONAPARTE**, Joseph, the eldest brother of Napoleon I., was born in Corsica in 1768. In 1796, with the rise of his brother to fame after the brilliant campaign of Italy, Joseph began a varied diplomatic and military career. At length, in 1806, Napoleon, having himself assumed the imperial title in 1804, made Joseph king of Naples, and two years afterward transferred him to Madrid as King of Spain. His position here, entirely dependent on the support of French armies, became almost intolerable. He was twice driven from his capital by the approach of hostile armies, and the third time, in 1813, he fled, not to return. After Waterloo he went to the U. States, and lived for a time near Philadelphia, assuming the title of Count de Survilliers. He subsequently came to England, finally repaired to Italy, and died at Florence in 1844.

**BONAPARTE**, Letizia Ramolino, the mother of Napoleon I., and, after Napoleon's assumption of the imperial crown, dignified with the title of Madame Mère, was born at Ajaccio in 1750, and was married in 1767 to Charles Buonaparte. She was a woman of much beauty, intellect, and force of character. Left a widow in 1785, she resided in Corsica till her son became first consul, when an establishment was assigned to her at Paris. On the fall of Napoleon she returned to Rome, where she died in 1836.

**BONAPARTE**, Louis, second younger brother of the Emperor Napoleon I., and father of Napoleon III., was born in Corsica in 1778. He accompanied Napoleon to Italy and Egypt, and subsequently rose to the rank of a brigadier-general. In 1802 he married Hortense Beauharnais, Josephine's daughter, and in 1806 was compelled by his brother to accept, very reluctantly, the Dutch crown. He exerted himself in promoting the welfare of his new subjects, and resisted as far as in him lay the tyrannical interference and arbitrary procedure of France; but disagreeing with his brother in regard to some measures of the latter, he abdicated in 1810 and retired to Grätz under the title of the Count of St. Leu. He died at Leghorn in 1846. He was the author of several works which show considerable literary ability.

**BONAPARTE**, Louis. See Napoleon III.

**BONAPARTE**, Lucien, Prince of Canino, next younger brother of Napoleon I., was born at Ajaccio in 1775. Shortly after Napoleon's return from Egypt in 1799 he was elected President of the Council, in which position he contributed greatly to the fall of the Directory and the establishment of his brother's power, on the famous 18th Brumaire (9th Nov.). Next year, as

Napoleon began to develop his system of military despotism, Lucien, who still held to his republican principles and candidly expressed his disapproval of his brother's conduct, fell into disfavor and was sent out of the way as ambassador to Spain. Eventually, when Napoleon had the consulate declared hereditary, Lucien withdrew to Italy, settling finally at Rome, where he devoted himself to the arts and sciences, and lived in apparent indifference to the growth of his brother's power. In vain Napoleon offered him the crown, first of Italy and then of Spain; but he came to France and exerted himself on his brother's behalf, both before and after Waterloo. Returning to Italy, he spent the rest of his life in literary and scientific researches, dying in 1840. Pope Pius VII. made him Prince of Canino.

**BONAPARTE**, Napoleon. [See Napoleon I.]

**BONAVENTURE**, St., otherwise John of Fidanza, one of the most renowned scholastic philosophers, was born in 1221 in the Papal States; became in 1243 a Franciscan monk; in 1253 teacher of theology at Paris, where he had studied, in 1256 general of his order, which he ruled with a prudent mixture of gentleness and firmness. In 1273 Gregory X. made him a cardinal, and he died in 1274 while papal legate at the Council of Lyons. He was canonized in 1482 by Sixtus IV.

**BOND**, an obligation in writing to pay a sum of money, or to do or not to do some particular thing specified in the bond. The person who gives the bond is called the obligor, the person receiving the bond is called the obligee. A bond stipulating either to do something wrong in itself or forbidden by law, or to omit the doing of something which is a duty, is void. No person who cannot legally enter into a contract, such as an infant or a lunatic, can become an obligor, though such a person may become an obligee. No particular form of words is essential to the validity of a bond. A common form of bond is that on which money is lent to some company or corporation, and by which the borrowers are bound to pay the lender a certain rate of interest for the money. Goods liable to customs or excise duties are said to be in bond when they are temporarily placed in vaults or warehouses under a bond by the importer or owner that they will not be removed till the duty is paid on them. Such warehouses are called bonded warehouses.

**BONE**, a hard material constituting the framework of Mammalia, birds, fishes, and reptiles, and thus protecting vital organs such as the heart and lungs from external pressure and injury. In the fœtus the bones are formed of cartilaginous (gristly) substance, in different points of which earthy matter—phosphates and carbonates of lime—is gradually deposited till at the time of birth the bone is partially formed. After birth the formation of bone continues, and, in the temperate zones, they reach their perfection in men between the ages of twenty and twenty-five. From this age till fifty they change but slightly; after that period they grow



thinner, lighter, and more brittle. Bones are densest at the surface, which is covered by a firm membrane called the periosteum; the internal parts are more cellular, the spaces being filled with marrow, a fatty tissue, supporting fine blood-vessels. Bone consists of nearly 34 per cent organic material and of 66 per cent inorganic substances, chiefly phosphate, carbonate, and fluoride of lime, and phosphate of magnesium. The organic material is converted into gelatine by boiling. It is this which makes bones useful for yielding stock for soup. The inorganic substances may be dissolved out by steeping the bone in dilute hydrochloric acid. Bones, from the quantity of phosphates they contain, make excellent manure.

**BONE-ASH, BONE-EARTH**, the earthy or mineral residue of bones that have been calcined so as to destroy the animal matter and carbon. It is composed chiefly of phosphate of lime, and is used for making cupels in assaying, etc.

**BONE BLACK, IVORY BLACK, or ANIMAL CHARCOAL**, is obtained by heating bones in close retorts till they are reduced to small coarse grains of a black carbonaceous substance. This possesses the valuable property of arresting and absorbing into itself the coloring matter of liquids which are passed through it. Hence it is extensively used in the process of sugar-refining, when cylinders of large dimensions filled with this substance are used as filters. After a certain amount of absorption the charcoal becomes saturated and ceases to act. It has then to be restored by reheating or other methods. Bone black has also the property of absorbing odors, and may thus serve as a disinfectant of clothing, apartments, etc.

**BONE-DUST**, bones ground to dust to be used as manure.

**BONE MANURE**, one of the most important fertilizers in agriculture. The value of bones as manure arises chiefly from the phosphates and nitrogenous organic matters they contain; and where the soil is already rich in phosphates bone is of little use as manure. It is of most service therefore where the soil is deficient in this respect, or in the case of crops whose rapid growth or small roots do not enable them to extract a sufficient supply of phosphate from the earth, turnips, for instance, or late-sown oats and barley. There are several methods for increasing the value of bones as manure, by boiling out the fat and gelatine, for instance, the removal of which makes the bones more readily acted on by the weather and hastens the decay and distribution of their parts, or by grinding them to dust, or dissolving them in sulphuric acid, by which latter course the phosphates are rendered soluble in water.

**BONFIRE**, a large fire lighted out of doors in celebration of some event; originally a fire in which bones were burned.

**BONHEUR** (bo-neur), Rosa, a distinguished French artist and painter of animals, born at Bordeaux 22d March, 1822. She died in 1899.

**BONIFACE**, the name of nine popes. Boniface I., elected 418. He was the first to assume the title of the First Bishop of Christendom. He died 422.—Boniface II., elected 530, died in 532. He acknowledged the supremacy of the secular sovereign in a council held at Rome.—Boniface III. chosen 607, died nine months after his election.—Boniface IV., elected 608. He converted the Pantheon at Rome into a Christian church.—Boniface V., 619 to 625. He endeavored to diffuse Christianity among the English.—Boniface VI., elected 896, died a fortnight after.—Boniface VII., elected 947, during the lifetime of Benedict VI., and therefore styled antipope. Expelled from Rome in 984, he returned and deposed and put to death Pope John XIV. He died 985.—Boniface VIII. (1294-1303), Benedict Cajetan, one of the ablest and most ambitious of the popes. His idea was, like that of Gregory VII., to raise the papal chair to a sort of universal monarchy in temporal as well as spiritual things.—Boniface IX. (1389-1404), elected during the schism in the church while Clement VII. resided at Avignon. He died in 1404.

**BONN**, an important German town in the Rhenish province of Prussia, on the left bank of the Rhine. It is chiefly important for its famous university founded in 1777 by Elector Maximilian Frederick of Cologne. Enlarged and amply endowed by the King of Prussia in 1818, it is now one of the chief seats of learning in Europe, with a library of more than 200,000 volumes, an anatomical hall, mineralogical and zoological collections, museum of antiquities, a botanical garden, etc. Bonn was long the residence of the Electors of Cologne, and finally passed into the hands of Prussia by the arrangements of the Congress of Vienna in 1815. Pop. 50,737.

**BONNER**, Robert, an American editor and publisher, born in Ireland in 1824, died in New York in 1899. He published the Ledger, in the columns of which appeared stories, articles, and poems by numerous literary men of England and America.

**BON'NET**, a covering for the head, now especially applied to one worn by females. In England the bonnet was superseded by the hat as a head-dress two or three centuries ago, but continued to be distinctive of Scotland to a later period.

**BONNET-ROUGE** (bo-nā-rōzh), the emblem of liberty during the French Revolution, and then worn as a head-dress by all who wished to mark themselves as sufficiently advanced in democratic principles: also called cap of liberty.

**BONNEVILLE**, Benjamin L. E., an American engineer, born in France in 1795, died in 1878. He graduated at West Point, explored the Rocky Mountains, and built a military road in Mississippi. He served in the Florida, Mexican, and civil wars, and became a brigadier-general in 1865.

**BO'NUS**, something given over and above what is required to be given, especially an extra dividend to the shareholders of a joint-stock company,

holders of insurance policies, etc., out of accrued profits.

**BONY PIKE, or GARFISH**, a remarkable genus of fishes inhabiting N. American lakes and rivers, and one of the few living forms that now represent the order of ganoid fishes so largely developed in previous geological epochs. The body is covered with smooth enameled scales, so hard that it is impossible to pierce them with a spear. The common garfish attains the length of 5 feet, and is easily distinguished by the great length of its jaws.

**BONZES**, the name given by Europeans to the priests of the religion of Fo or Buddha in eastern Asia, particularly in China, Burmah, Tonquin, Cochinchina, and Japan. They do not marry, but live together in monasteries. There are also female bonzes, whose position is analogous to that of nuns in the Roman Catholic Church.

**BOOBY**, a swimming bird nearly allied to the gannet, and so named from the extraordinary stupidity with which, as the older voyagers tell, it would allow itself to be knocked on the head without attempting to fly. The booby lives on fish, which it takes, like the gannet, by darting down upon them when swimming near the surface of the water.

**BOODHA**. See Buddha.

**BOOK**, the general name applied to a printed volume. In early times books were made of the bark of trees; hence the Latin liber means bark and book, as in English the words book and beech may be connected. The materials of ancient books were largely derived from the papyrus, a plant which gave its name to paper. The use of parchment, prepared from skins, next followed, until it was supplanted in Europe by paper in the 12th century, though paper was made in Asia long before this.

**BOOK-BINDING**, the art of making up the sheets of a book into a volume with a substantial case or covering. In the middle ages the work of binding the manuscripts then used was done by the monks, in a heavy and excessively solid style. With the invention of printing, and the consequent multiplication of books, binding became a great mechanical art, in which the Italians of the 15th and 16th centuries took the lead. Later on the French binders enjoyed a well-deserved supremacy for delicate and elegant work, and it was not till almost the opening of the 19th century that English bookbinding began to take the foremost place.

**BOOK-KEEPING** is the art or method of recording mercantile or pecuniary transactions, so that at any time a person may be able to ascertain the details and the extent of his business. It is divided, according to the general method pursued, into bookkeeping by single or by double entry. Bookkeeping by single entry is comparatively little used, except in retail businesses of small extent, where only the simplest record is required.

Bookkeeping by double entry, a system first adopted in the great trading cities of Italy, gives a fuller and more accurate record of the movement of a business, and is necessary in all extensive



mercantile concerns. The chief feature of double entry is its system of checks, by which each transaction is twice entered, to the Dr. side of one account and then to the Cr. side of another. An important feature of the system consists in adopting, in addition to the personal accounts of debtors and creditors contained in the ledger, a series of what are called book accounts, which are systematic records in the form of debtor and creditor of particular classes of transactions. For every debt incurred some consideration is received. This consideration is represented under a particular class or name in the ledger, as the debtor in the transaction in which the party from whom the consideration is received is the creditor. Thus A buys goods to the value of \$500 from B. He enters these in his journal—Stock Acct. Dr. \$500 (for goods purchased) ordinary To B, \$500. The first \$500 appears in the Dr. column of the journal, and is posted in the ledger to the debit of Stock Account; the second appears in the Cr. column, and is posted in the ledger to the Cr. of B. In like manner, when the goods are paid, Cash, for which an account is opened in the ledger, is credited with \$500, and B is debited with the same. When the goods are sold (for cash) Stock is credited and Cash is debited. If the amount for which they sell is greater than that for which they were bought, there will be a balance at the debit of Cash, and a balance at the credit of Stock. The one balance represents the cash actually on hand (from this transaction), the other the cause of its being on hand. If there is a loss on the transaction, the balance will be on the other side of these accounts. Ultimately the balance thus arising at Dr. or Cr. of Stock is transferred to an account called Profit and Loss, which makes the stock account represent the present value of goods on hand, and the profit and loss account, when complete, the result of the business. In this system the risk of omitting any entry, which is a very common occurrence in single bookkeeping, is reduced to its smallest, as, unless a particular transaction is omitted in every step of its history, the system will inexorably require that its whole history should be given to bring the different accounts into harmony with each other.

**BOOK OF MORMON**, the bible of the Mormons, first published in 1830 by Joseph Smith, who claimed it was written on gold plates, buried in a sacred hill, and disclosed to Smith by an angel. The plates disappeared, but a translation (the original characters were Egyptian) was made by the finder, who, upon it, founded the Mormon faith.

**BOOK-PLATE**, a label pasted on the inside of the first cover of a book, giving the name of the owner. Book-plates are a very ancient usage and some of them, especially rare ones, or those from the books of famous persons, are very valuable. Sir Wollaston Franks made a collection of 200,000 book-plates, which is now in the British Museum. Many noted artists, such as Hogarth, for example, drew book-plates for distinguished patrons.

**BOOKS**, Censorship of, the supervision of books by some authority so as to settle what may be published. After the invention of printing the rapid diffusion of opinions by means of books induced the governments in all countries to assume certain powers of supervision and regulation with regard to printed matter. The popes were the first to institute a regular censorship. By a bull of Leo X. in 1515 the bishops and inquisitors were required to examine all works before they were printed, with a view to prevent the publication of heretical opinions. As this decree could not be carried out in countries which had accepted the reformed religion, they prepared a list of prohibited books (*Index Librorum Prohibitorum*), books, that is, which nobody was allowed to read under penalty of the censure of the church. This index continues to be reprinted and revised down to date, as well as another index commonly called the *Index Expurgatorius*, containing the works which may be read if certain expurgations have been made. In England the censorship was established by act of parliament in 1662, but before that both the well-known Star-chamber and the parliament itself had virtually performed the functions. In 1694 the censorship in England ceased entirely. In France the censorship, like so many other institutions, was annihilated by the revolution. During the republic there was no formal censorship, but the supervision of the directory virtually took its place, and at length in 1810 Napoleon openly restored it under another name (*Direction de l'Imprimerie*). After the restoration it underwent various changes, and was re-established by Napoleon III. with new penalties. In the old German empire the diet of 1530 instituted a severe superintendence of the press, but in the particular German states the censure was very differently applied, and in Protestant states especially it has never been difficult for individual authors to obtain exemption. In 1849 the censorial laws were repealed, but were again gradually introduced, and still exist in a modified form in most of the German states. The censorship was abolished in Denmark in 1770, in Sweden in 1809, in the Netherlands in 1815. In Russia and Austria there is a despotic censorship. See Press, Liberty of the.

**BOOM**, a long pole or spar run out from various parts of a ship or other vessel for the purpose of extending the bottom of particular sails. Also a strong beam, or an iron chain or cable, fastened to spars extended across a river or the mouth of a harbor, to prevent an enemy's ships from passing.

**BOOMERANG**, a missile instrument used by the Australian aborigines, and by some peoples of India, made of hard wood, about the size of a common reaping-hook, and of a peculiar curved shape, sometimes resembling a rude and very open V. The boomerang, when thrown as if to hit some object in advance, instead of going directly forward, slowly ascends in the air, whirling round and round to a considerable height, and returns to the position of the thrower. If it hits an object of course it falls.

The Australians are very dexterous with this weapon, and can make it go in almost any direction, sometimes making it rebound before striking.



Boomerangs.

**BOONDEE'**, or **BUNDI**, a principality, Hindustan, in Rajputana, under British protection; area, 2300 sq. miles. Pop. 295,675. Boondee is the capital. Pop. 22,544.

**BOONE**, Daniel, an American pioneer of civilization, born 1735, died 1820. In 1769 with five companions he went to explore the little known region of Kentucky, and was taken prisoner by the Indians. In 1775 he built a fort on the Kentucky river, where Boonesborough now is, and settled there. In



Daniel Boone

1778 he was taken prisoner by the Indians, and was retained and adopted into the family of a Shawanese chief, but at length he effected his escape. In the end of the century he removed from Kentucky into Missouri. From him a number of places in the U. States take the name of Boone, Booneville, etc., all of small importance.

**BOOT**, an article of dress, generally of leather, covering the foot and extending to a greater or less distance up the leg. Hence the name was given to an instrument of torture made of iron, or a combination of iron and wood, fastened on to the leg, between which and the boot wedges were introduced and driven in by repeated blows of a mallet, with such violence as to crush both muscles and bones. The special object of this form of torture was to extort a confession of guilt from an accused person.

**BOOTH**, Agnes, an American actress, born in Sydney, Australia, in 1843. She was born Marion Agnes Land Rookes, and made her debut in San Francisco when very young, playing Shakespearian parts. In 1867 she



married Junius Brutus Booth and until 1891 was prominent on the American stage. After the death of her husband she married (1885) John B. Schoeffel.

**BOOTH**, Ballington, an American religious leader, son of William Booth, founder of the Salvation Army. In 1896 he disagreed with his father and founded the American Volunteers, an organization of a kind with the Salvation Army.

**BOOTH**, Edwin Thomas, an American actor, son of Junius Brutus Booth, regarded as the most finished actor produced by the American stage. He was born at Belair, Md., in 1833, and died at New York in 1893. Booth made his debut in Boston in 1849. In 1851 he appeared in Richard III. at New York, married Mary Devlin in 1860, who died three years later. Among the rôles played with excellent success by Booth were Shylock, Hamlet, Richard III., Richelieu, and Cassius. He built Booth's Theater, New York, in 1869, played in Europe in 1880 and 1882, toured the U. States with Lawrence Barrett in 1891, and retired soon afterward. Booth's Hamlet was regarded as unapproachable by many critics.

**BOOTH**, James Curtis, an American chemist, born at Philadelphia in 1810, died 1888. He was a specialist in the chemistry of mining and was superintendent of the United States Mint at Philadelphia from 1849 till his death.

**BOOTH**, John Wilkes, brother of Edwin Booth, and the assassin of Abraham Lincoln, born 1839, killed in 1865 by his pursuers. Booth was a highly sensitive man, and an intense secessionist. For a time he had been an actor, but the civil war, it is believed, turned his brain. He organized a conspiracy to assassinate the president, vice-president, and cabinet, and succeeded in the first part of his plan when he shot Lincoln on the night of April 14, 1865, at Ford's Theater in Washington. He was overtaken April 26 at Bowling Green, Va., and, refusing to surrender, was shot. Four of his accomplices, including Mrs. Surratt, were hanged.

**BOOTH**, Junius Brutus, a British actor of great ability, born in 1796, died in 1852. He appeared first in London in 1813 and subsequently became noted on the British stage. Coming to America in 1821 he settled in this country. His principal rôles were Sir Giles, Hamlet, Richard, and Iago. He threw so much passion into his work that his mimic antagonists in stage duels were often in serious danger of being injured.

**BOOTH**, Maude Ballington, a leader of the American Volunteers, wife of Ballington Booth. She was born in London in 1865 and entered the Salvation Army at the age of seventeen. In 1896 she seceded with her husband from the Salvation Army.

**BOOTH**, William, founder of the Salvation Army, born in England in 1829. He was formerly a Methodist Episcopal minister, but in 1865 began an independent mission movement in London, which gradually developed into the Salvation Army, which name it was given in 1878. He is the author of numerous books, among them *In Darkest England* and *The Way Out* (1890).

**BOOTH-TUCKER**, Emma Moss, a leader of the Salvation Army, daughter of William Booth and wife of Commander Booth-Tucker. She was born in England in 1860 and for many years has been head of the Salvation Army in the U. States jointly with her husband.

**BOOTH-TUCKER**, Frederick St. George de Latour, chief of the Salvation Army organization in the U. States. He was born in India in 1853, and occupied an official position in the Indian civil service, which he resigned in 1881 to join the Salvation Army. In 1896 he was appointed commander of the army in America, with headquarters in New York.

**BORACIC ACID, BORIC ACID**, a compound of the element boron, with hydrogen and oxygen. Boracic acid is found as a saline incrustation in some volcanic regions, is an ingredient in many minerals, and is contained in the steam which, along with sulphureous exhalations, issues from fissures in the soil in Tuscany. The steam from the fumaroles here is now an important

Pure borax forms large transparent six-sided prisms, which dissolve readily in water, effloresce in dry air, and when heated melt in their water of crystallization, swell up, and finally fuse to a transparent glass. Borax has a variety of uses. In medicine it is employed in ulcerations and skin diseases. It has valuable antiseptic and disinfecting properties, and is now much used for the preservation of meat, fish, and milk. It is also employed in soldering metals, and in making fine glaze for porcelain as it renders the materials more fusible. It is used in enameling, and in making beads, glass, and cement.

**BORDEAUX** (bor-dô'), one of the most important cities and ports of France, capital of the dep. of Gironde, on the Garonne, about 70 miles from the sea. In the old town are the Cathedral of Saint-André, St. Michael's Church, with its superb front of florid Gothic, the Hotel de Ville, and the Palais de Justice. There are extensive and finely-planted promenades. Its position gives it admirable facilities for trade, and enables it to rank next after



Bordeaux—Quay of Louis XVIII.

source of the acid, a system of condensation and evaporation being employed. The acid forms white, shining, scaly crystals, which on heating melt into a transparent mass, when cooled resembling glass. It dissolves in water, and has a slight acid taste; it colors blue litmus purple, and the yellow coloring matter turmeric brown. The chief use of the acid is as a source of borax, the biborate of sodium. See Borax.

**BORAX**, biborate of sodium. Native borax has long been obtained under the name of tincal, from India, the main source being not India but a series of lakes in Thibet. As imported it is in small pieces of a dirty yellowish color, and is covered with a fatty or soapy matter. Tincal, which contains various impurities, was formerly the only source of borax; but besides Tuscany other sources of boracic acid, more particularly in North and South America, and the salt mines at Stassfurt, etc., in Germany, have been rendered available. The U. States yields large quantities, there being rich deposits of borax and boracic minerals on the Pacific slope.

Marseilles and Havre in respect of the tonnage employed. Large vessels sail up to the town and there is ready communication by railway or river with the Mediterranean, Spain, and the manufacturing centers of France. The chief exports are wine and brandy; sugar and other colonial produce and wood are the chief imports. Ship-building is the chief industry, and there are sugar-refineries, woolen and cotton mills, potteries, soap-works, distilleries, etc.

**BORDELAIS WINES**, the wines of Bordeaux and district, the name of vin de Bordeaux being generally given to the wines made in the eleven departments of the southwest of France, Gironde, Landes, Lot, Tarn et Garonne, etc., though it is in the Gironde alone that the famous growths are found. The soil of Médoc (a sandy and calcareous loam) produces such famous wines as Château-Margaux, Château-Lafitte, and Château-Latour. The wines of this country are the best which France produces. Their characteristics are fine bouquet, velvety softness on the palate, and the faculty of acting beneficially



on the stomach without mounting too readily to the head. Besides the red wines of the Bordelais, known under the general name of claret, there are also white wines, of which the finest growths are Sauterne, Preignac, Barsac, etc.

**BORDER RUFFIANS**, a term applied to certain pro-slavery men who went to Kansas from Missouri in 1853 to turn the elections.

**BORDER STATES**, a term applied to certain states which were on the border of the free states. Under this head are classified usually, Maryland, Delaware, Virginia, Kentucky, Tennessee, Missouri, and Arkansas.

**BORDER WAR**, the war waged between the pro- and anti-slavery men in Kansas some years previous to the civil war.

**BO'REAS**, the name of the north wind as personified by the Greeks and Romans.

**BORER**, a name given to the larvæ of certain insects which bore holes in trees and thus injure them.

**BORGIA**, Cesare (che'zá-re bor'já), the natural son of Pope Alexander VI., and of a Roman lady named Vanozza, born in 1478. He was made Duc de Valentinois by Louis XII. In 1499 he married a daughter of King John of Navarre. He carried on a series of petty wars, made himself master of the Romagna, attempted Bologna and Florence, and had seized Urbino when Alexander VI. died, 1503. Enemies now rose against him on all sides, one of the most bitter of whom was the new pope, Julius II. Borgia was arrested and carried to Spain. He at length made his escape to his brother-in-law the King of Navarre, and was killed before the castle of Viana, March 12, 1507. He was charged with the murder of his elder brother, of the husband of his sister Lucretia, and the stiletto or secret poisoning was freely used against those who stood in his way. With all his crimes he was a patron of art and literature.

**BORGIA**, Lucretia, daughter of Pope Alexander VI., and sister of Cesare Borgia. She was accused by contemporaries of incest, poisoning, and almost every species of enormous crime; but several modern writers defend her, maintaining that the charges which have been made against her are false or much exaggerated. She was a patroness of art and literature. Born 1480, died 1523.

**BORING**, the process of perforating wood, iron, rocks, or other hard substances by means of instruments adapted for the purpose. For boring wood the tools used are awls, gimlets, augers, and bits of various kinds, the latter being applied by means of a crank-shaped instrument called a brace, or else by a lathe, transverse-handle, or drilling-machine. Boring in metal is done by drills or boring-bars revolved by boring-machines. Boring in the earth or rock for mining, geologic, or engineering purposes is effected by means of augers, drills, or jumpers, sometimes wrought by hand, but now usually by machinery driven by steam or frequently by compressed air. In

ordinary mining practice a bore-hole is usually commenced by digging a small pit about 6 feet deep, over which is set up a shear-legs with pulley, etc. The boring-rods are from 10 to 20 feet in length, capable of being jointed together by box and screw, and having a chisel inserted at the lower end. A lever is employed to raise the bore-rods, to which a slight twisting motion is given at each stroke, when the rock at the bottom of the hole is broken by the repeated percussion of the cutting-tool. Various methods are employed to clear out the triturated rock. The work is much quickened by the substitution of steam-power, water-power, or even horse-power for manual labor. Of the many forms of boring-machines now in use may be mentioned the diamond boring-machine, invented by Leschot, a Swiss engineer. In this the cutting-tool is of a tubular form, and receives a uniform rotatory motion, the result being the production of a cylindrical core from the rock of the same size as the inner periphery of the tube. The boring-bit is a steel thimble, about 4 inches in length, having two rows of Brazilian black diamonds firmly embedded therein, the edges project slightly. The diamond teeth are the only parts which come in contact with the rock, and their hardness is such that an enormous length can be bored with but little appreciable wear.

**BORN**, Bertrand de, French troubadour and warrior, born about the middle of the 12th century in the castle of Born, Périgord; died about 1209. He dispossessed his brother of his estate, whose part was taken by Richard Cœur de Lion in revenge for De Born's satirical lays. Dante places him in the Inferno on account of his verses intensifying the quarrel between Henry II. and his sons.

**BOR'NEO**, one of the islands of the Malay Archipelago, and the third largest in the world. Greatest length 780, greatest breadth, 690 miles; area 283,358 sq. miles. There are several chains of mountains ramifying through the interior, the culminating summit (13,698 feet) being Kini-Balu, near the northern extremity. The rivers are very numerous, and several of them are navigable for a considerable distance by large vessels. There are a few small lakes. Borneo contains immense forests of teak and other trees, besides producing various dye-woods, camphor, rattans and other canes, gutta-percha and india-rubber, honey and wax, etc. Its fauna comprises the elephant, rhinoceros, tapir, leopard, buffalo, deer, monkeys (including the orang-outang), and a great variety of birds. The mineral productions consist of gold, antimony, iron, tin, quicksilver, zinc, and coal, besides diamonds. It is only portions of the land on the coast which are well cultivated. Among cultivated products are sago, gambier, pepper, rice, tobacco, etc. Edible birds'-nests and trepang are important articles of trade. The climate is not considered unhealthful. The pop. is estimated at about 1,700,000, comprising Dyaks (the majority of the inhabitants), Malays, Chinese, and Bugis. The southwestern, southern, and eastern portions of the island are

possessed by the Dutch, under whom are a number of semi-independent princes. On the n.w. coast is the Malay kingdom of Borneo or Bruni. Its chief town is Bruni, on the river of the same name, a place of considerable trade, and the residence of the sultan. British North Borneo has an area of about 31,000 sq. miles (slightly greater than Scotland), several splendid harbors, a fertile soil, and a good climate. At present the population is sparse, and a large part of the territory consists of virgin forests. The soil is believed to be well adapted



Dyaks of Borneo.

for coffee, sago, tapioca, sugar, tobacco, cotton, etc. Probably there are valuable mineral deposits also, gold having been already found. The chief settlement is Sandakan, the capital, on Sandakan Bay. The revenue is from customs and excise dues, licenses, etc. Birds'-nests, rattans, gutta-percha, timber, etc., are exported, the trade being chiefly with Singapore and Hong-Kong. Pop. estimated at 150,000. North Borneo, Bruni, and Sarawak are all under British protection.

**BOR'NU**, a negro kingdom of the central Sudan, on the w. side of Lake Chad, with an area of about 79,000 sq. miles, and a pop. estimated at 5,000,000. Kuka, the capital (pop. 60,000), near the western shore of Lake Chad, is one of the greatest markets in central Africa, a large trade being done in horses, the breed of which is famed throughout the Sudan. Another large town, on the shore of the lake, is Ngornu. Bornu is now under British and German protection.

**BOROGLYCERIDE**, a compound of boracic acid with glycerine, represented by the formula. It is a powerful antiseptic, and being perfectly harmless is as useful in the preservation of food as in surgery, etc.

**BORON**, the element from which all boracic compounds are derived, is a dark brown or green amorphous powder, which stains the skin, has no taste or odor, and is only slightly soluble in water. It also crystallizes into darkish brilliant crystals nearly as hard as dia-



mond, which, in the form of dust, are used for polishing. It is one of the few elements which combine direct with nitrogen.

**BORROME'O**, Carlo, Count, a celebrated Roman Catholic saint and cardinal, born 1538, at Arona, on Lago Maggiore, died at Milan 1584. Immediately after his death miracles were said to be wrought at his tomb, and his canonization took place in 1610.—His nephew, Count Federigo Borromeo, also cardinal and Archbishop of Milan, equally distinguished for the sanctity of his life and the benevolence of his character, was born at Milan in 1564, and died in 1631. He is celebrated as the founder of the Ambrosian Library.

**BOR'ROW**, George, English writer, born 1803, died 1881. He had a passion for foreign tongues, stirring scenes, and feats of bodily prowess. He associated much with the gypsies, and acquired an exact knowledge of their language, manners, and customs. As agent of the British and Foreign Bible Society he traveled France, Germany, Russia, and the East; spent five years in Spain, and published *The Gypsies in Spain* (1841), and *The Bible in Spain* (1842), the best known of his works. Other works are *Lavengro*, largely autobiographical (1850), *The Romany Rye* (1857), *Wild Wales* (1862), and *Dictionary of the Gypsy Language* (1874).

**BORROWING**, the act of taking something with agreement to return the identical thing or its equivalent, or its equivalent plus compensation to the lender. The first kind of contract is called in law *commodatum*, the second *locatio*. Unless a time for return is set the borrowed thing is returnable at the demand of the lender.

**BOS'NIA**, a Turkish province in the northwest of the Balkan Peninsula, west of Serbia, by the Treaty of Berlin (1878) to be administered for an undefined future period by the Austrian government; area (including Herzegovina and Novi-bazar), 23,570 sq. miles (of which Bosnia Proper occupies 16,200), with 1,568,092 inhabitants, mostly of Slavonian origin. In 1708 Bosnia was annexed by Austria.

**BOS'PORUS**, or **BOSPHORUS**, the strait, 19 miles long, joining the Black Sea with the Sea of Marmora, called also the Strait of Constantinople. It is defended by a series of strong forts; and by agreement of the European powers no ship of war belonging to any nation shall pass the Bosphorus without the permission of Turkey.

**BOSS**, a word used to designate a master of some kind, generally of a lower order. It is derived from the Dutch *baas*, which means the same thing. In the U. States the word is used colloquially to designate a man of influence and importance in almost any occupation, such as labor boss, railroad boss, political boss. The last mentioned term is applied to politicians who have acquired the power to influence the action of conventions, etc. In very recent years it has lost much of its opprobrious signification, and is now applied to any politician who controls a large number of followers.

**BOSS**, Lewis, an American astronomer, born at Providence, R. I., in 1846. He is chief of the Dudley Observatory at Albany, N. Y., and in 1878 published a list of declinations of fixed stars, and 1890 a catalogue of 8241 stars. He observed the transit of Venus in 1882 for the U. States government.

also to Roxbury, is another important artery. State street is the financial center. Atlantic avenue, 100 feet wide, extends along a portion of the waterfront at the head of the principal wharves. Many of the old streets have been straightened, widened, and extended at enormous expense; and in place of the waters of the Back Bay has



View in the Bosphorus.

**BOSSUET** (bos-û-â), Jacques Bénéigne, illustrious French preacher and theologian, was born in 1627, died in 1704. He was unrivaled as a pulpit orator, and greatly distinguished for his strength and acumen as a controversialist. The great occupation of his life was controversy with the Protestants.

**BOSTON**, the capital of Massachusetts, metropolis of New England, situated on Massachusetts Bay, 232 miles from New York, and 450 miles from Washington. It is the center of a vast suburban population, and is unique among American cities for its external resemblance to the cities of Europe. Pop. 622,000.

Boston was founded in 1630, and derives its name from the English city Boston. It figured prominently in the American revolution, was evacuated by the British March 17, 1776, was

grown up the "Back Bay quarter," a region of broad streets and stately avenues, costly and often elegant dwellings, noble churches, fine public and private buildings, famous institutions, great hotels and apartment-houses; remarkable especially for the taste displayed in its embellishment and the richness and variety of its architecture. Beacon street, sweeping over Beacon Hill, for years the finest residential quarter, is now continued across the Back Bay into the Brighton district as a broad boulevard. Commonwealth avenue, 250 feet wide, with a mall in the center, also extending through the Back Bay section to and through the Brighton district, is one of the finest boulevards in the world. Near the heart of Boston proper is the Common, set apart for public use by the first settlers, a rare old park, with broad malls and pleasant by-paths shaded by elms, lindens, and other graceful trees; and beyond, separated from it by a single street, is the Public Garden, the gateway to the Back Bay quarter. In these parks and other public places are numerous statues and monuments. The greater public-park system consists of a chain of parks beginning with the Back Bay Fens, and extending through parkways to the Arboretum and Franklin Park in the West Roxbury district, and along the shores of Dorchester Bay to the Marine Park at South Boston.

The Subway, an underground roadway, carries the street-car traffic through portions of the heart of the city. It was built by the municipality, under the direction of a Transit Commission, in 1897-99, at a cost of \$4,400,000, and leased to the local street railway company for a period of twenty years at a rental of 4½ per cent of its cost. An elevated system between the Roxbury



almost wiped out by fire in 1872, and was rebuilt with vast improvement within two years. Washington street, extending from Haymarket Square to and through the Roxbury district, has always been the main thoroughfare. Tremont street, from Scollay Square

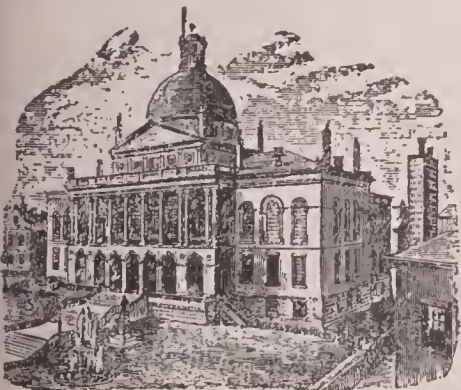


and Charlestown districts, completed in 1901, is connected with the Subway. The steam railways radiating from the city, formerly 5, subsequently consolidated into 3 great systems, connect Boston with all parts of New England,



The city hall Boston.

and the far West, South, and East. They enter two great stations, the Union Station at the north, and the South, or Terminal Station, at the south. The system of public schools comprises kindergarten, primary, grammar, high, Latin, normal, and special schools, in which 86,719 pupils are taught by 1970 teachers. There are 226 schoolhouses. The Boston Public Library, opened in 1854, is wholly free, and is supported by the city at an annual expense of about \$255,000. It is the largest library in the world for free circulation. With its 10 branches it contains 746,383 volumes, and the annual circulation is over 1,250,000 volumes. Its executive force consists of 140 persons. A new public library building on Copley Square, Back Bay, costing upward of \$2,225,000, was built in 1888-95. It is a monumental structure, of elegant proportions, the interior especially enriched by some of the best of modern decorative work. Among other notable libraries are those of the Boston



State capitol, Boston.

Athenæum, the Massachusetts Historical Society, the N. E. Historic-Genealogical Society, and the State Library. Conspicuous among the higher institutions for instruction are the Massa-

chusetts Institute of Technology, the Boston University, the Boston College (Roman Catholic), the medical and dental schools connected with Harvard University, the Massachusetts Normal Art School, and the New England Conservatory of Music.

The first bank in America was established in Boston in 1686, and the first savings institution in 1816. There are 43 national banks with a total capital of \$38,500,000; 13 trust companies, \$8,500,000; and 17 savings-banks. The valuation of taxable property in Boston is \$1,129,175,832; the tax levy, \$16,928,136; the tax rate, \$14.70.

**BOSTON MASSACRE, THE**, the killing of several citizens of Boston by British troops in a riot on March 5, 1770, which was the culmination of much quarreling between the soldiery and the people. Seven soldiers were tried for murder, but were acquitted. The occurrence helped to produce the American revolution, and, in fact, has been called "the first drama of the revolution."

**BOSTON PORT BILL**, a law passed in March, 1774, by the British parliament closing the harbor of Boston for having destroyed the famous tea cargo on December 16th previously. It reacted by hurrying on the revolution. See Boston Tea Party.

**BOSTON TEA PARTY**, a name given the throwing of 350 chests of tea into Boston harbor by a mob of citizens disguised as Indians on Dec. 16, 1773. It was as a protest to the importation of tea following the policy of taxation without representation. See Boston Port Bill, The.

**BOSTON UNIVERSITY**, founded in 1869, at Boston, supporting schools of medicine, law, and theology. It has an endowment of \$1,500,000, a college of liberal arts, and a college of agriculture. It offers sixty-four free scholarships, 200 general scholarships, and two fellowships. It has a registration of 1324 students, 134 instructors, and a library of 30,000 volumes.

**BOS'WELL**, James, the friend and biographer of Dr. Johnson. He was born at Edinburgh in 1740, and died in London in 1795. In 1763 he became acquainted with Johnson—a circumstance which he himself calls the most important event of his life. He afterward visited Voltaire at Ferney, Rousseau at Neuchâtel, and Paoli in Corsica, with whom he became intimate. In 1785 he settled at London, and was called to the English bar. Being on terms of the closest intimacy with Johnson, he at all times diligently noted and recorded his sayings, opinions, and actions, for future use in his contemplated biography. In 1773 he accompanied him on a tour to the Scottish Highlands and the Hebrides, and he published an account of the excursion after their return. His *Life of Samuel Johnson*, one of the best pieces of biography in the language, was published in 1791.

**BOTANY** is the science which treats of the vegetable kingdom.

Plants may be studied from several different points of view. The consideration of their general form and structure,

and the comparison of these in the various groups from the lowest to the highest, constitutes morphology. Anatomy and histology treat respectively of the bulkier and the more minute internal structure of the parts, and physiology of their functions. Systematic botany considers the arrangement of plants in groups and subgroups according to the greater or less degree of resemblance between them. Geographical botany tells of their distribution on the earth's surface, and strives to account for the facts observed, while palæobotany bears the same relation to distribution in the successive geological strata which make up the earth's crust. Economic botany comprises the study of the products of the vegetable kingdom as regards their use to man.

The simplest plants are very minute, and can only be studied by use of the compound microscope. A little rain-water which has been standing some time when thus examined is found to contain a number of roundish green objects, each of which is an individual plant, consisting of one cell only. Increased complexity of structure is exemplified in many of the ordinary seaweeds, the stalk and more or less flattened expansions of which are several to many cells thick, the external cell-layers differing somewhat in structure from the internal.

Going a step higher we reach the Mosses, where, for the first time, we distinguish a clear differentiation of the part of the plant above ground into a stem and leaves borne upon it. The stem is attached to the soil by delicate colorless hairs—root-hairs. Its structure is, however, very simple, and the leaves are merely thin plates of cells. Microscopical examination of sections of stem, leaf, or root, shows great differences in structure between various groups of cells; there is, in fact, marked differentiation of tissues. A tissue is a layer, row, or group of cells which have all undergone a similar development; by differentiation of tissues we mean that various layers, rows, or groups have developed in different ways, so that we can make out and mark by distinctive names the elements of which a stem or leaf is built up.

Phanerogams, or Flowering-plants, represent the highest group of plants: Seed-plants would be a better name, as their main distinction from those already described is the production of a seed. The much greater variety in form and structure seen in them as compared with the ferns justifies us in regarding them as the highest group in the vegetable kingdom. They are divided into two classes: (1) those in which the seed is developed on an open leaf, termed a carpel, and called therefore Gymnosperms; and (2) those in which the seed is developed in a closed chamber, formed by the folding together of one or more carpels, and called accordingly Angiosperms. To the former belong the Conifers—pines and firs—and Cycads; to the latter the rest of our trees and the enormous number of field and garden plants which are not ferns or mosses.



The embryo, or rudimentary plant contained in the seed, consists of a very short axis or stem, bearing one (in Monocotyledons), two (in Dicotyledons), or several (in many Gymnosperms) primary leaves, the cotyledons, above which it terminates in a little bud or plumule, while below them the axis passes into the primary root or radicle. When the seed germinates the radicle is the first to protrude between the separating seed-coats, and growing downward fixes itself in the soil. Then the plumule grows out accompanied or not, as the case may be, by the cotyledons, which have hitherto concealed and protected it, and by rapid growth soon develops into a stem bearing leaves. The stem continues growing in length at its apex throughout the life of the plant; at a short distance below the apex growth in length ceases; but while in Gymnosperms and Dicotyledons it also continually increases in thickness through its whole length, Monocotyledons are distinguished by the fact that when once the stem has been formed its diameter remains unchanged. The same rule applies to the branches.

Branches proceed from buds which are formed in the autumn in the axils of the leaves, that is, at the point where the leaf or leaf-stalk is joined on to the stem; they remain dormant through the winter, and grow out into new shoots in the spring.

The leaf is borne on the stem; its tissues, epidermal, cortical, and vascular, are continuous with those of the stem; but it is distinguished by the fact that its growth is limited, it soon reaches the normal size and stops growing.

In Dicotyledons and Gymnosperms the primary root or radicle after emerging from the seed continues to grow vigorously, often with copious lateral branching, forming an extensive root-system; but in Monocotyledons it soon perishes, and its place is taken by roots developed from the base of the stem, such roots are called adventitious. Adventitious roots occur also in Dicotyledons, as in creeping stems like the strawberry, which bears buds at intervals from which new shoots are formed and roots given off. The clinging roots of the ivy are also adventitious. There are many forms of roots: some are large and woody, as those of trees; others fibrous, as in grasses; or they may be greatly swollen, forming the fleshy globose root of the turnip, or the conical one of the carrot. Such fleshy developments are due to the plant storing up a quantity of reserve food-material in the first year on which to draw in the second, when it will want to expand all its energy in flowering and fruiting. The potato, which is a swollen stem, answers the same purpose. The mistletoe and other parasites give off sucker-like roots which penetrate into the tissues of their host.

As to their reproduction, plants may be asexual, that is, not requiring the cooperation of two distinct (male and female) elements to produce a new individual; or sexual, when two such elements are necessary, and a process of fertilization takes place in which the female cell is impregnated by one or

more male cells, and the cell resulting from the fusion of the two gives rise by very extensive growth and division to a new individual. In the very lowest plants, like Protozoceus, only asexual reproduction is known, but in most Thallophytes both forms occur. In the asexual method numbers of small cells called spores are produced which on germination give rise to a plant similar to that which bore them. In the sexual process the contents of a male organ escape and impregnate the oosphere, or female cell contained in the female organ. The fertilized oosphere is termed an oospore, and by growth and division gives rise to a plant like that on which it was produced.

The flower of a seed-plant is a shoot modified for purposes of reproduction. A buttercup, for instance, consists of a number of modified leaves borne in several whorls on the somewhat expanded top of the stalk, the receptacle or thalamus. Dissection of the flower shows (1) An outer whorl of five green leaves, very like ordinary foliage leaves; these are the sepals, and together make up the calyx. (2) An inner whorl of five yellow leaves, composing the corolla, each leaf being a petal. (3) More or less protected by the petals are a great number of stamens, each consisting of a slender stalk or filament capped by an anther, a little case containing the dry powdery pollen. The stamens are really much modified leaves; collectively they form the androecium. (4) The rest of the receptacle right up to the apex is also covered by very much modified leaves, the carpels, forming the pistil or gynoecium. Each carpel consists of a basal portion, the ovary, in which is contained an ovule, and of a terminal beak-like portion, the style. The androecium and gynoecium, being the parts directly concerned in reproduction, are distinguished, as the essential organs of the flower, from the calyx and corolla, which are only indirectly so concerned, though of great importance in the process.

An important characteristic is the fruit, which is the result of fertilization on the ovary.

Many flowers contain both stamens and pistil, these are termed bisexual or hermaphrodite (♂); while others contain stamens or pistil only, such are said to be unisexual. When both male (♂) and female (♀) flowers occur on the same plant the species is monœcious, like the hazel; while it is diœcious if the separate sexes are borne on different individuals, as is the case in the hop.

Plants which, like the sunflower, pass through all the stages from germination to production of fruit and seed in one season, and then perish, are called annuals; if two years are required, as with the turnip and onion, they are biennials; while perennials last several to many years, during which they may flower and seed many times.

A plant is built up chiefly of four elements: carbon, hydrogen, oxygen, and nitrogen, with small quantities of sulphur and phosphorus and some mineral matter. Substances containing these must therefore form the food. A green plant can take up its carbonaceous food in a very simple form by means of the

green chlorophyll contained especially in its leaves. This absorbs some of the sun's rays, and by virtue of the energy represented by the light so absorbed it can obtain the carbon from the carbonic acid gas present in the atmosphere. An animal, having no chlorophyll, has to use more complex carbon-containing compounds, in fact those which have already been worked up in the vegetable kingdom. The other items of the food are obtained from the water and mineral salts in the soil, the salts being brought into solution and absorbed with large quantities of water by the roots. The leaves are the laboratory where the food is worked up into the complex compounds which form the plant substance, and to raise the crude material from the absorbing roots to the leaves there is an upward current of liquid through the stem. This is known as the transpiration current; it travels in the wood-cells. A much larger quantity of water is absorbed than is required as food; this is got rid of by transpiration, that is, by the giving off of water-vapor from the leaves. This is evident if a plant be placed under a glass shade in the sunlight, the vapor given off becoming condensed on the glass. The complex compounds elaborated in the leaves are returned to all parts of the plant where growth, or storage of reserve-material, is taking place, by means of the other constituent of the vascular bundle, the bast tissue.

**BOTANY BAY**, a bay in New South Wales, so called by Captain Cook on account of the great number of new plants collected in its vicinity. The English penal settlement, founded in 1788, and popularly known as Botany Bay, was established on Port Jackson, some miles to the northward, near where Sydney now stands.

**BOT-FLY**, a fly the maggots of which are developed from the egg in the intestines of horses or under the skins of oxen; a gadfly.

**BOTH'NIA, GULF OF**, the northern part of the Baltic Sea, which separates Sweden from Finland. Length about 450 miles, breadth 90 to 130, depth from 20 to 50 fathoms. Its water is but slightly salt, and it freezes in the winter, so as to be passed by sledges and carriages.

**BOTH'WELL**, James Hepburn, Earl of, known in Scottish history by his marriage to Queen Mary, was born about 1526. It is believed that he was deeply concerned in the murder of Darnley, Mary's husband, and that he was even supported by the queen. He was charged with the crime and tried, but, appearing along with 4000 followers, was readily acquitted. He was now in high favor with the queen, and with or without her consent he seized her at Edinburgh, and carrying her a prisoner to Dunbar Castle prevailed upon her to marry him after he had divorced his own wife. But by this time the mind of the nation was roused on the subject of Bothwell's character and actions. A confederacy was formed against him, and in a short time Mary was a prisoner in Edinburgh, and Bothwell had been forced to flee to Denmark, where he died in 1576.



**BOTTICELLI** (bot-tē-chel'lē), Sandro (for Alessandro), an Italian painter of the Florentine school, born in 1447, died 1515. Working at first in the shop of the goldsmith Botticello, from whom he takes his name, he showed such talent that he was removed to the studio of the distinguished painter Fra Lippo Lippi. From this master he took the fire and passion of his style, and added a fine fantasy and delicacy of his own. He painted flowers, especially roses, with incomparable skill. In his later years Botticelli became an ardent disciple of Savonarola, and is said by Vasari to have neglected his painting for the study of mystical theology.

**BOTTLE**, a vessel of moderate or small size, and with a neck, for holding liquor. By the ancients they were made of skins or leather; they are now chiefly made of glass or earthenware. The common black bottles of the cheapest kind are formed of the most ordinary materials, sand with lime, and sometimes clay and alkaline ashes of any kind, such as kelp, barilla, or even wood ashes. This glass is strong, hard, and less subject to corrosion by acids than flint-glass.

**BOTTLE-CHART**, a chart which shows the course traveled by a sealed bottle thrown into the sea. It had its origin in the custom of throwing into the sea sealed bottles containing intelligence from travelers on long or disastrous voyages. The chart represents the travels of various bottles. It is used chiefly by hydrographers. Charts of this kind are made at the U. States hydrographic office.

**BOTTLE-FLOWER**. See Blue-bottle.

**BOTTLE-GOURD**, a kind of gourd, the dried fruits of which, when the pulp is removed, are used in warm countries for holding liquids.

**BOTTLE-NOSE**, a kind of whale, of the dolphin family, 20 to 28 feet long, with a beaked snout and a dorsal fin, a native of northern seas. The caaing whale is also called bottle-nose.

**BOTTLE-TREE**, a tree of northeastern Australia, with a stem that



Bottle-tree.

bulges out into a huge rounded mass. It abounds in a nutritious mucilaginous substance.

**BOTTLING**, the art of placing liquid in bottles, corking, and otherwise sealing them. Special apparatus has been designed for this work by which the bottles are cleaned, filled, corked, and sealed. One machine will clean 75 dozen bottles a day. Self-feeding cork-

ing machines will each cork 2000 bottles an hour. A wiring machine will wire 1000 bottles an hour, and these can be labeled by machinery at the rate of 12,000 a day. The liquids bottled on the largest scale are all kinds of beverages, alcoholic and otherwise.

**BOT'TOMRY** is a contract by which a ship is pledged by the owner or master for the money necessary for repairs to enable her to complete her voyage. The freight and even the cargo may be pledged as well as the ship. The conditions of such a contract usually are that the debt is repayable only if the ship arrives at her destination. As the lender thus runs the risk of her loss, he is entitled to a high premium or interest on the money lent. The latest bottomry bond takes precedence of all previous ones.

**BOUCHES-DU-RHONE** (bōsh-dū-rōn), a dep. in the s. of France, in ancient Provence. Chief town, Marseilles. Area, 1,267,088 acres, of which about one-half is under cultivation. The Rhone is the principal river. The manufactures are principally soap, brandy, olive-oil, chemicals, vinegar, scent, leather, glass, etc. The fisheries are numerous and productive. Pop. 737,112.

**BOUCICAULT** (bō'si-kō), Dion, dramatic author and actor, born at Dublin Dec. 20, 1822. He was intended for an architect, but the success of a comedy, the well-known London Assurance, which he wrote when only nineteen years old, determined him for a career in connection with the stage. Boucicault being a remarkably facile writer, in a few years had produced quite a lengthy list of pieces, both in comedy and melodrama, and all more or less successful. He produced a new style of drama, dealing largely in sensation, but with more heart in it than his earlier work. The Colleen Bawn and Arrah-na-Pogue are the best examples. Indeed the best Mr. Boucicault could do was such pictures of Irish life and manners. He died in 1890.

**BOUDOIR** (bō'dwār), a small room, elegantly fitted up, destined for retirement. The boudoir is the peculiar property of the lady, where only her most intimate friends are admitted.

**BOUGUER** (bō-gā), Pierre, a French mathematician and astronomer, born in 1698. He was associated with Godin and La Condamine in an expedition to the South American equatorial regions to measure the length of a degree of the meridian. The main burden of the task fell upon Bouguer, who performed it with great ability, and published the results in his *Théorie de la Figure de la Terre*. He also invented the heliometer, and his researches about light laid the foundation of photometry. He died in 1758.

**BOUILLON**, Godfrey. See Godfrey of Bouillon.

**BOULDER** (bō'l'dēr), a rounded water-worn stone of some size; in geol. applied to ice worn and partially smoothed blocks of large size lying on the surface of the soil, or embedded in clays and gravels, generally differing in composition from the rocks in their vicinity, a fact which proves that they must have been transported from a distance, prob-

ably by ice. When lying on the surface they are known as erratic blocks. The boulder-clay in which these blocks are found belongs to the post-tertiary or quaternary period. It occurs in many localities, consists of a compact clay often with thin beds of gravel and sand interspersed, and is believed to have been deposited from icebergs and glaciers in the last glacial period.

**BOULEVARD** (bōl-vār), a French word formerly applied to the ramparts of a fortified town, but when these were leveled, and the whole planted with trees and laid out as promenades, the name boulevard was still retained. Modern usage applies it also to many streets which are broad and planted with trees, although they were not originally ramparts. The most famous boulevards are those of Paris.

**BOULOGNE** (bō-lon-yē or bō-lōn), or **BOULOGNE-SUR-MER**, a fortified seaport of France, dep. Pas de Calais, at the mouth of the Liane. In the castle, which dates from 1231, Louis Napoleon was imprisoned in 1840. Boulogne has manufactories of soap, earthenware, linen and woolen cloths; wines, coal, corn, butter, fish, linen and woolen stuffs, etc., are the articles of export. Steamboats run daily between this place and England, crossing over in two or three hours. Pop. 49,083, about a tenth being English.

**BOULOGNE-SUR-SEINE**, a town of France, dep. Seine, southwest of Paris, of which it is a suburb. It is from this place that the celebrated Bois de Boulogne gets its name. Pop. 47,168.

**BOUNTY**, in political economy, is a reward or premium granted for the encouragement of a particular species of trade or production, the idea being that the development of such trade or production will be of national benefit. The subsidies granted for carrying the oceanic mails are the only bounties now made by the English government. —The same name is given to a premium offered to induce men to enlist in the army and navy.

**BOUNTY JUMPER**, a term applied to those individuals who, during the civil war, enlisted in the army for a reward and deserted at the earliest opportunity. This was repeated again and again, one man having confessed to "jumping the bounty" thirty times.

**BOURBON** (bōr-bōn), an ancient French family which has given three dynasties to Europe, the Bourbons of France, Spain, and Naples. The first of the line known in history is Adhemar, who, at the beginning of the 10th century, was lord of the Bourbonnais (now the dep. of Allier). The power and possessions of the family increased steadily through a long series of Archambaulds of Bourbon till in 1272 Beatrix, daughter of Agnes of Bourbon and John of Burgundy, married Robert, sixth son of Louis IX. of France, and thus connected the Bourbons with the royal line of the Capets. Their son Louis had the barony converted into a dukedom and became the first Duc de Bourbon. Two branches took their origin from the two sons of this Louis, duke of Bourbon, who died in 1341. The royal branch was divided by the



two sons of Louis XIII., the elder of whom, Louis XIV., continued the chief branch, while Philip, the younger son, founded the house of Orleans as the first duke of that name. The kings of the elder French royal line of the house of Bourbon run in this way: Henry IV., Louis XIII., XIV., XV., XVI., XVII., XVIII., and Charles X. The last sovereigns of this line, Louis XVI., Louis XVIII., and Charles X. (Louis XVII., son of Louis XVI., never obtained the crown), were brothers, all of them being grandsons of Louis XV. Louis XVIII. had no children, but Charles X. had two sons, viz., Louis Antoine de Bourbon, duke of Angoulême, who was dauphin till the revolution of 1830, and died without issue in 1844, and Charles Ferdinand, duke of Berry, who died 14th Feb., 1820, of a wound given him by a political fanatic. The Duke of Berry had two children: (1) Louise Marie Thérèse, called Mademoiselle d'Artois; and (2) Henri Charles Ferdinand Marie Dieudonné, born in 1820, and at first called Duke of Bourdeaux, but afterward Count De Chambord, who was looked upon by his party until his death (in 1883) as the legitimate heir to the crown of France.

The branch of the Bourbons known as the House of Orleans was raised to the throne of France by the revolution of 1830, and deprived of it by that of 1848. It derives its origin from Duke Philip I. of Orleans (died 1701), second son of Louis XIII., and only brother of Louis XIV.

**BOURGEOIS** (bur-jō'), a size of printing type larger than brevier and smaller than long-primer, used in books and newspapers.

**BOURGEOISIE** (börzh-wā-zē), a name applied to a certain class in France in contradistinction to the nobility and clergy as well as to the working-classes. It thus includes all those who do not belong to the nobility or clergy, and yet occupy an independent position, from financiers and heads of great mercantile establishments at the one end to master tradesmen at the other. It corresponds pretty nearly with the English term "middle classes."

**BOUTELLE**, Charles Addison, an American writer and legislator, born in Maine in 1839, died in 1901. He was a delegate to several republican national conventions and served three terms in congress.

**BOUTWELL**, George Sewall, an American legislator, politician, and cabinet officer, born in Massachusetts in 1818. He was secretary of the treasury from 1869 to 1873, in which latter year he became a U. States senator. He published several books of speeches and political history. He died in

**BOW**, the name of one of the most ancient and universal weapons of offense. It is made of steel, wood, horn, or other elastic substance. The figure of the bow is nearly the same in all countries. The long bow was the favorite national weapon in England. The battles of Crecy (1346), Poitiers (1356), and Agincourt (1415) were won by this weapon. It was made of yew, ash, etc., of the height of the archer, or

about 6 feet long, the arrow being usually half the length of the bow. The arbalest, or cross-bow, was a popular weapon with the Italians, and was introduced into England in the 13th century, but never was so popular as the long-bow. In England the strictest regulations were made to encourage and facilitate the use of the bow.

**BOW**, in music, is the name of that well-known implement by means of which the tone is produced from violins, and other instruments of that kind.

**BOWDITCH'S PRACTICAL NAVIGATOR**, a compendium of information for navigators. It contains explanations of all the ordinary methods of determining the ship's position at sea, together with all the tables necessary for using them; also descriptions of instruments used in navigation, methods of making hydrographic surveys, charts, etc. The copyright of this work was purchased by the United States government, and it is now published and issued by the hydrographic office, United States navy. It has been several times revised, and a considerable amount of matter has been added.

**BOWDOIN** (bō'dn), James, born 1727, at Boston, died 1790. In 1785 was appointed governor of Massachusetts, and he was a member of the convention assembled to deliberate on the adoption of the constitution of the United States. He was a friend and correspondent of Franklin.—Bowdoin College, Brunswick, Maine, was named after him. It is a flourishing institution, which has had among its students Longfellow and Hawthorne.

**BOWDOIN**, James, an American public man and philanthropist, born at Boston in 1752, the son of Governor Bowdoin. He graduated at Harvard, studied also at Oxford, and traveled in Europe, returning to America soon after the battle of Lexington. In 1805 he was United States minister to Spain. He left to Bowdoin College 6000 acres of land and \$5500, the reversion of the island of Naushon, where he had his summer home, a large library; and an extensive collection of philosophical apparatus. He died in 1811.

**BOWDOIN COLLEGE**, chartered in 1794 by Massachusetts, and named after James Bowdoin, governor of Massachusetts, of which state Maine was formerly a district. The college opened at Brunswick, Cumberland Co., in 1802, with Joseph McKeen, D.D., a Dartmouth graduate, as its first president. The present buildings of the college, representing a value of \$600,000, include King Chapel, the Walker Art building, the Searles Science building, Memorial Hall, the Hubbard Library, and a gymnasium, observatory, and dormitories. The course of study leading to the degree of A.B. is based on a knowledge of the ancient and modern languages and mathematics, and includes such other courses as are usually given in smaller colleges of the first class. Connected with Bowdoin College is the Medical School of Maine, organized in 1820.

**BOWER-BIRD**, a name given to certain Australian birds of the starling family from a remarkable habit they

have of building bowers to serve as places of resort. The bowers are constructed on the ground, and usually under overhanging branches in the most retired parts of the forest. They are decorated with variegated feathers,



Bower-bird and its run.

shells, small pebbles, bones, etc. At each end there is an entrance left open. These bowers do not serve as nests at all, but seem to be places of amusement and resort, especially during the breeding season.

**BOWERY**, a famous street of New York City, running from Chatham Square to Cooper Union. It was formerly a street of dangerous and low resorts, but recently has been invaded by retail business stores.

**BOWIE-KNIFE**, a long kind of knife like a dagger, but with only one edge, named after Colonel James Bowie, and used by hunters and others.

**BOW INSTRUMENTS** are all the instruments strung with catgut from which the tones are produced by means of the bow. The most usual are the double-bass, the small bass, or violoncello, and the violin proper. In reference to their construction the several parts are alike; the difference is in the size.

**BOWLINE** (bō'-), in ships, a rope leading forward, which is fastened by bridles to loops in the ropes on the perpendicular edge of the square sails. It is used to keep the weather-edge of the sail tight forward and steady when the ship is close-hauled to the wind.

**BOWLS**, a game played with a variable number of wooden pins and a wooden ball on a smooth wooden runway called an alley. The alley is 75 feet long, 41 inches wide, and flanked on both sides by a gutter for the return of the balls. The pins are "set up" at one end and the player tries to knock them down (according to rule) by rolling the ball along the floor from the other end. The game in the U. States is played with ten, nine, five, three, or other number of pins, and usually three rolls are permitted for each frame, the purpose being to knock down all the pins. When all the pins are knocked with one stroke (in tenpins) the play is called a "ten strike," or "double spare," meaning that the player has two more rolls on the next frame. A player who makes "ten strikes" to the end scores 300. The game has a very ancient origin.

**BOWMAN**, Edward Morris, an American musician, born at Barnard, Vt., in 1848. In 1877 he published his *Manual of Musical Theory*, which was trans-



lated into German, and in 1881 became the first American associate of the Royal College of Organists of England. In 1891 he became professor of music in Vassar College, and has done much toward raising the tone of popular musical taste in the U. States.

**BOWSPRIT** (bō'-), the large boom or spar which projects over the stem of a vessel, having the foremast and foretopmast stays and staysails attached to it, while extending beyond it is the jib-boom.

**BOW-WINDOW**, a window constructed so as to project from a wall, properly one that forms a segment of a circle. See Bay-window.

**BOX-ELDER**, the ash-leaved maple, a small but beautiful tree of the U. States, from which sugar is sometimes made.

**BOXING**, or **PUGILISM**, a manner of fighting with the fists so common in England as to be regarded abroad as a national accomplishment. The art of boxing consists in showing skill in dealing blows with the fist against one's opponent, especially on the upper part of the body, while at the same time one protects one's self. In England professional boxers, who made a livelihood out of their skill in the art, were at one time common, especially during the reigns of the Georges, when persons of the highest rank were sometimes to be seen at pugilistic combats, and "professors" of the art frequently had members of the nobility among their pupils. Byron relates in his diary that he received instruction in boxing from the celebrated Jackson, who made a fortune as a pugilist. Boxing has, however, fallen in a great measure into disrepute, and prize-fights are illegal, and both the principals and the spectators may be proceeded against. At the gladiatorial shows of the Greeks and Romans boxing was common, but in a more dangerous form, the fist being armed with leather appliances loaded with iron or lead.

**BOXING-DAY**, the day after Christmas, which has long been held as a holiday in England. It is so called from the practice of giving Christmas boxes as presents on that day.

**BOXING THE COMPASS**, in seaman's phrase, the repetition of all the points of the compass in their proper order—an accomplishment required to be attained by all sailors.

**BOX-TORTOISE**, a name given to one or two North American tortoises that can completely shut themselves into their shell.

**BOX-TREE**, a shrubby evergreen tree, 12 or 15 feet high, a native of England, southern Europe, and parts of Asia, with small oval and opposite leaves, and greenish, inconspicuous flowers, male and female on the same tree. The wood is of a yellowish color, close-grained, very hard and heavy, and admits of a beautiful polish. On these accounts it is much used by turners, wood-carvers, engravers on wood (no wood surpassing it in this respect), and mathematical-instrument makers. Flutes and other wind-instruments are formed of it. The box of commerce comes mostly from the

regions adjoining the Black Sea and Caspian, and is said to be diminishing in quantity.

**BOYACA'**, in South America, one of the departments or provinces of Colombia. On the west side the country is traversed by a chain of the Andes, from which it slopes toward the east into immense plains or llanos, mostly uncultivated, and watered by the tributaries of the Orinoco. Area, 33,351 sq. miles; pop. 702,000.

**BOY'COTTING**, a name given to an organized system of social and commercial ostracism employed in Ireland in connection with the Land League and the land agitation of 1880 and 1881 and subsequently. Landlords, tenants, or other persons who are subjected to boycotting find it difficult or impossible to get any one to work for them, to supply them with the necessities of life, or to associate with them in any way. It took its name from Captain James Boycott, a Mayo landlord, against whom it was first put in force.

**BOY'DELL**, John, an English engraver, but chiefly distinguished as an encourager of the fine arts. He engaged Reynolds, Opie, West, and other celebrated painters to illustrate Shakespeare's works, and from their pictures was produced a magnificent volume of plates, the Shakespeare Gallery (London, Boydell, 1803). In 1790 Boydell had been made lord-mayor; but the outbreak of war consequent on the French revolution injured his foreign trade and brought him into difficulties. He died in 1804.

**BOYLE LECTURES**. See Boyle, Robert.

**BOYLE'S LAW**, otherwise called Mariotte's Law, a law in physics to the effect that the volume of a gas will vary inversely to the pressure to which it is subjected.

**BOYS' CLUBS**, associations of American boys for various purposes, chiefly maintained by their parents and grown-up friends. Of these, investigation has shown, there are nearly 1000 in the U. States, the membership consisting of boys ranging from ten to seventeen years old. The character of the clubs are social, industrial, literary, benevolent, musical, hunting and fishing, athletic, and game playing.

**BOZZARIS** (bot-sā'ris), Marko, a hero of the Greek war of independence against the Turks, born in the end of the 18th century. In the summer of 1823, when he held the command-in-chief of the Greek forces at Missolonghi, he made a daring night attack on the camp of the Pasha of Scutări, near Karpenisi. The attack was successful; but the triumph of the Greeks was clouded by the fall of the heroic Bozzaris. His deeds are celebrated in the popular songs of Greece.

**BRABANT'**, the central district of the lowlands of Holland and Belgium, extending from the Waal to the sources of the Dyle, and from the Meuse and Limburg plains to the lower Scheldt. It is divided between the kingdoms of Holland and Belgium, into three provinces: 1st, Dutch or North Brabant, area 1977 sq. miles, pop. 559,287; 2d, the Belgian province of Antwerp, area 1095 sq.

miles, pop. 837,976; and 3d, the Belgian province of South Brabant, area 1276 sq. miles, pop. 1,303,064.

**BRACELET**, a kind of ornament usually worn on the wrist, the use of which extends from the most ancient times down to the present, and belongs to all countries, civilized as well as uncivilized. Bracelets were in use in Egypt and among the Medes and Persians at a very remote period, and in the Bible the bracelet is frequently mentioned as an ornament in use among the Jews, both men and women. Among the ancient Greeks bracelets seem to have been worn only by the women. The spiral form was preferred, and very often made to assume the appearance of snakes, which went round the arm twice or thrice. Among the Romans it was a frequent practice for a general to bestow bracelets on soldiers who had distinguished themselves by their valor. Roman ladies of high rank frequently wore them both on the wrist and on the upper arm. Among the ancient heathen Germanic tribes they formed the chief and almost only ornament, as is shown by their being so often found in old graves. They seem to have been used by the men even more than by the women, and were the gifts by which an ancient German chief attached his followers to himself. So, in old Anglo-Saxon poems, "ring-giver" is a common name for the lord or ruler.

**BRACES**, in ships, ropes passing through blocks at the ends of the yards, used for swinging the latter round so as to meet the wind in any desired direction.

**BRACKET**, a short piece or combination of pieces, generally more or less triangular in outline, and projecting from a wall or other surface. They may be either of an ornamental order, as



Bracket,  
Harlestone church, Northamptonshire.

when designed to support a statue, a bust, or such like, or plain forms of carpentry, such as support shelves, etc. Brackets may also be used in connection with machinery, being attached to walls, beams, etc., to support a line of shafting.

**BRAD'DOCK**, Edward, major-general and commander of the British army in the expedition against the French on the river Ohio, in 1755. In the spring of that year he set out from Virginia to invest Fort Duquesne, now Pittsburg, but from want of caution fell into an Indian ambushade by which he lost nearly one-half of his troops and received himself a mortal wound.

**BRAD'DOCK**, a borough in Allegheny Co., Pa., 10 miles east of Pittsburg, on the Monongahela river, and on the



Pennsylvania, the Baltimore and Ohio, and the Pittsburg and Lake Erie railroads. Pop. 18,422.

**BRADFORD**, a mun., parl., and county bor. and important manufacturing town in W. Riding of Yorkshire, England. Bradford is the chief seat in England of the spinning and weaving of worsted yarn and woolens, but there are also manufactures of alpaca stuffs, plush and velvet, machine works, foundries, etc. Pop. 279,809.

**BRADFORD**, a city in McKean Co., Pa., 76 miles south of Buffalo, N. Y., on the Pennsylvania, the Erie, the Buffalo, Rochester and Pittsburg, and several local railroads. It is in a petroleum and natural-gas region. Pop. 18,129.

**BRADFORD**, William, one of the Pilgrim Fathers, born in England in 1590, died in 1657. He came over in the Mayflower in 1620 and founded Plymouth Colony. He acquired considerable fame by his exhaustive works on the history of Massachusetts.

**BRADLAUGH** (brad'la), Charles, English secularist, atheist, and advocate of republicanism, born in London in 1833. He is well known by his writings and lectures, and more especially by his efforts to gain admission to parliament. Being elected for Northampton in 1880 he claimed the right to make affirmation simply instead of taking the oath which members of parliament take before they can sit and vote, but being a professed atheist this right was denied him. Though he was repeatedly reelected by the same constituency, the majority of the House of Commons continued to declare him disqualified for taking the oath or affirming; and it was only after the election of a new parliament in 1885 that he was allowed to take his seat without opposition as a representative of Northampton. He was editor of the *National Reformer*. He died in 1891.

**BRADLEY**, Joseph P., an American jurist, born in New York in 1813, died in 1892. He was appointed associate justice of the United States Supreme court in 1870, and in 1877 was a member of the commission which decided the election of 1876 in favor of Rutherford B. Hayes.



Braxton Bragg.

**BRAGG**, Braxton, an American soldier. He was born in North Carolina in 1817 and died in 1876. During the

Mexican war he served under Taylor and took part in the engagements of Fort Pickens, Shiloh, Corinth, Perryville, Murfreesboro, Chattanooga, and other battles during the civil war. He fought against Sherman in Georgia and was under the command of General Johnston until the peace. After the war he devoted himself to civil engineering.

**BRAGG**, Edward Stuyvesant, an American legislator, born in New York in 1827. He served in the civil war as one of the "iron brigade" of Wisconsin, and has been prominent in democratic national politics. In 1902 he became consul general to the Cuban republic.

**BRAH'MA**, a Sanskrit word signifying (in its neuter form) the Universal Power or ground of all existence, and also (in its masculine form with long final syllable) a particular god, the first



Brahma—Bronze, Indian museum.

person in the Triad (Brahmā, Vishnu, and Siva) of the Hindus. The personal god Brahmā is represented as a red or golden-colored figure with four heads and as many arms, and he is often accompanied by the swan or goose. He is the god of the fates, master of life and death, yet he is himself created, and is merely the agent of Brahmā, the Universal Power. His moral character is no better than that of the Grecian Zeus.

**BRAH'MANISM**, a religious and social system prevalent among the Hindus, and so called because developed and expounded by the sacerdotal caste known as the Brahmins (from brahman, a potent prayer; from root brih or vrih, to increase). It is founded on the ancient religious writings known as the Vedas and regarded as sacred revelations, of which the Brahmins as a body became custodians and interpreters, being also the officiating priests and the general directors of sacrifices and religious rites. As the priestly caste increased in numbers and power they went on elaborating the ceremonies, and added to the Vedas other writings tending to confirm the excessive pretensions of this now predominant caste, and give them the sanction of a revelation. The earliest supplements to the Vedas are the Brahmanas, more fully explaining the functions of the officiating priests. Both together form the revealed Scriptures of the Hindus. In time the caste of Brahmins came to be accepted as a divine institution, and an elaborate system of rules defining and enforcing by

the severest penalties its place as well as that of the inferior castes was promulgated. Other early castes were the Kshatriyas or warriors, and the Vaisyas or cultivators, and it was not without a struggle that the former recognized the superiority of the Brahmins. It was by the Brahmins that the Sanskrit literature was developed; and they were not only the priests, theologians, and philosophers, but also the poets, men of science, lawgivers, administrators, and statesmen of the Aryans of India.

The sanctity and inviolability of a Brahman are maintained by severe penalties. The murder of one of the order, robbing him, etc., are inexpiable sins; even the killing of his cow can only be expiated by a painful penance. A Brahman should pass through four states: First, as Brahmachari, or novice, he begins the study of the sacred Vedas, and is initiated into the privileges and the duties of his caste. He has a right to alms, to exemption from taxes, and from capital and even corporal punishment. Flesh and eggs he is not allowed to eat. Leather, skins of animals, and most animals themselves are impure and not to be touched by him. When manhood comes he ought to marry, and as Grihastha enter the second state, which requires more numerous and minute observances. When he has begotten a son and trained him up for the holy calling he ought to enter the third state, and as Vanaprastha, or inhabitant of the forest, retire from the world for solitary praying and meditation, with severe penances to purify the spirit; but this and the fourth or last state of a Sannyasi, requiring a cruel degree of asceticism, are now seldom reached, and the whole scheme is to be regarded as representing rather the Brahmanical ideal of life than the actual facts.

The worship represented in the oldest Vedic literature is that of natural objects: the sky, personified in the god Indra; the dawn, in Ushas; the various attributes of the sun, in Vishnu, Surya, Agni, etc. These gods were invoked for assistance in the common affairs of life, and were propitiated by offerings which, at first few and simple, afterward became more complicated and included animal sacrifices. In the later Vedic hymns a philosophical conception of religion and the problems of being and creation appears struggling into existence; and this tendency is systematically developed by the supplements and commentaries known as the Brahmanas and the Upanishads. In some of the Upanishads the deities of the old Vedic creed are treated as symbolical. Brahma, the supreme soul, is the only reality, the world is regarded as an emanation from him, and the highest good of the soul is to become united with the divine. The necessity for the purification of the soul in order to its reunion with the divine nature gave rise to the doctrine of metempsychosis or transmigration.

This philosophical development of Brahmanism gave rise to a distinct separation between the educated and the vulgar creeds. While from the fifth to the first century B.C. the higher thinkers among the Brahmins were



developing a philosophy which recognized that there was but one god, the popular creed had concentrated its ideas of worship round three great deities—Brahmā, Vishnu, and Siva—who now took the place of the confused old Vedic Pantheon. Brahmā, the creator, though considered the most exalted of the three, was too abstract an idea to become a popular god, and soon sank almost out of notice. Thus the Brahmans became divided between Vishnu, the preserver, and Siva, the destroyer and reproducer, and the worshipers of these two deities now form the two great religious sects of India. Siva, in his philosophical significance, is the deity mostly worshiped by the conventional Brahman, while in his aspect of the Destroyer, or in one of his female manifestations, he is the god of the low castes, and often worshiped with degrading rites. But the highly cultivated Brahman is still a pure theist, and the educated Hindu in general professes to regard the special deity he chooses for worship as merely a form under which the One First Cause may be approached.

The sharp division of the people of India into civilized Aryans and rude non-Aryans has had a great influence upon Brahmanism, and thus the spiritual conceptions of the old Vedic creed have been mixed in modern Hinduism with degrading superstitions and customs belonging to the so-called aboriginal races. Suttee, for example, or the burning of widows, has no authority in the Veda, but like most of the darker features of Hinduism is the result of a compromise which the Brahmanical teachers had to make with the barbarous conceptions of non-Aryan races in India. The Buddhist religion has also had an important influence on the Brahmanic.

The system or caste originally no doubt represented distinctions of race. The early classification of the people was that of "twice-born" Aryans (priests, warriors, husbandmen) and once-born non-Aryans (serfs); but intermarriages, giving rise to a mixed progeny, and the variety of employments in modern times, have profoundly modified this simple classification. Innumerable minor distinctions have grown up, so that among the Brahmans alone there are several hundred castes who cannot intermarry or eat food cooked by each other.

The Brahmans represent the highest culture of India, and as the result of centuries of education and self-restraint have evolved a type of man distinctly superior to the castes around them. They have still great influence, and occupy the highest places at the courts of princes. Many, however, are driven by need or other motives into trades and employments inconsistent with the original character of their caste.

**BRAIN**, the center of the nervous system, and the seat of consciousness and volition in man and the higher animals. It is a soft substance, partly gray and partly whitish, situated in the skull, penetrated by numerous blood-vessels, and invested by three membranes or meninges. The outermost, called the *dura mater*, is dense and

elastic. The next, the *tunica arachnoidea*, is very thin, and is really double. The third, the *pia mater*, covers the whole surface of the brain, and is full of blood-vessels. The brain consists of two principal parts, connected by bands of fibers. The one, called the *cerebrum*, occupies, in man, the upper part of the head, and is seven or eight times larger than the other, the *cerebellum*, lying behind and below it. The surface of the brain exhibits the appearance of a series of ridges and furrows, forming what are called the convolutions. The cerebrum is divided into two portions, the right and left hemispheres, by the longitudinal fissure, the hemispheres being at the same time transversely con-



Brain and spinal cord

ected by a band of nervous matter called the *corpus callosum*. The external or grayish substance of the brain is softer than the internal white substance. The *cerebellum* lies below the cerebrum, in a peculiar cavity of the skull. It is divided into a right and a left hemisphere, connected by a bridge of nervous matter called the *pons Varolii*, under which is the *medulla oblongata* or continuation of the spinal marrow. Like the cerebrum, it is gray on the outside and whitish within. At the base of the brain are several masses of nervous matter or ganglia known as the *corpora striata* (two), *optic thalami* (two), and *corpora quadrigemina* (four); and there are in it certain cavities or ventricles. Every part of the brain is

exactly symmetrical with the part opposite. Twelve pairs of nerves proceed from the base of the brain, including the nerves for the organs of smell, of sight, of hearing, and of taste, also those for the muscles of the face, those for the cavity of the mouth and for the larynx. When compared with the brain of other animals, the human brain presents striking differences. Even the brain of the higher classes of the inferior vertebrate animals differs from that of man, especially in the degree of development; while among the lower grades there is sometimes, properly speaking, no brain at all, but only nerve ganglia, which correspond to the brain. In size, also, the brain of the lower animals, although sometimes (as in the elephant) actually greater, is always much less when compared with the size of the whole body, and it is found that the size of the brain proportionally to the size of the body is a direct measure of the intelligence of different animals. In man the brain weighs from 2 to 4 lbs., the average weight in male European adults being 49 to 50 oz., or about  $\frac{1}{16}$ th of the weight of the body; in the dog the average weight is about  $\frac{1}{12}$ th of the animal; in the horse  $\frac{1}{10}$ th; and in the sheep  $\frac{1}{15}$ th. The heaviest brain yet known was that of Cuvier—64½ oz. The brain of females weighs 5 oz. less on the average than that of males. The brain attains its highest degree of development earlier any other part of the body. In old age it loses both in bulk and in weight. Comparatively little is known of the functions of the separate parts of the brain, but, speaking generally, the parts lying in front have functions connected with the intellectual part of man's nature; while the parts lying nearer the back of the head belong more to our merely animal or organic nature. As the central organ of the nervous system the brain is sympathetically affected in nearly all cases of acute disease. Diseases of the brain fall into two classes, according as they exhibit mental characteristics alone, or also anatomical disturbances. To the former class belong *hypochondria*, *mania*, etc. Among the latter may be mentioned *meningitis*, or inflammation of the membranes of the brain, which seldom occurs without affecting also the substance of the brain, and thus giving rise to *phrenitis*; *hydrocephalus*, or water in the head, caused by pressure of water in the cavities of the brain; softening of the brain, frequently the result of chronic inflammation; and *plethora*, or poverty of blood in the brain, which, though opposite diseases, may cause the same symptoms of giddiness and headache.

**BRAINARD**, David Legge, an American traveler and explorer, born in New York in 1856. He was sergeant of the Franklin Bay Expedition in 1881, and won latitude 83° 24' 30" north in that enterprise, which was the record for thirteen years. In 1900 he was sent to the Philippines as major in the regular army.

**BRAKE**, a contrivance for retarding or arresting motion by means of friction. In machinery it generally consists of a simple or compound lever, that may be pressed forcibly upon the periphery of



a wheel, fixed upon a shaft or axis. A similar contrivance is attached to road and railway carriages, but continuous brakes applied to every pair of wheels in a railway train, and operated by air either by the compression or vacuum method, are now generally used on railways. By the first method, of which the Westinghouse brake is an example, the air is compressed by a pump on the locomotive and conveyed by pipes and tubes to cylinders which are under each car, and the pistons of which act on the brake-levers. In the vacuum method, exemplified in the Loughridge brake, the air is exhausted from the device beneath the car, and the pressure of the atmosphere operates the brake-levers.

**BRAKE, AIR.** See Air-brake.

**BRAMBLE**, the name commonly applied to the bush with trailing prickly stems which bears the well-known berries usually called in Scotland brambles, and in England blackberries. It is similar to the raspberry, and belongs to the same genus. It is rarely cultivated, but as a wild plant it grows in great abundance. The flowers do not appear till late in the summer, and the fruit, which is deep purple or almost black in color, does not ripen till autumn.

**BRAN**, the husky part of wheat separated by the bolter from the flour. Its components are: water, 13; gluten, 19.5; fatty matter, 5; husk with starch, 55; and ashes, 7.5; but the results of different analyses vary considerably. It is employed in feeding cattle, and has also been found useful as a manure.

**BRANDENBURG**, a province of Prussia, surrounded mainly by Mecklenburg and the provinces of Pomerania, Posen, Silesia, and Prussian Saxony. The soil consists in many parts of barren sands, heaths, and moors; yet the province produces much grain, as well as fruits, hemp, flax, tobacco, etc., and supports many sheep. The forests are very extensive. The principal streams are the Elbe, the Oder, the Havel, and the Spree. Berlin is locally in Brandenburg. Area, 15,600 sq. miles; pop. 3,108,554. Most of the inhabitants are Lutherans.—The town Brandenburg is on the Havel, 35 miles w.s.w. of Berlin. Pop. 49,263.

**BRAND'ING**, a form of punishment once in use in England for various crimes, but abolished in 1822. It was performed by means of a red-hot iron, and the part which was branded was the cheek, the hand, or some other part of the body. Even after branding had been abolished in all other cases, a milder form of it was for a long time retained in the army as a punishment for desertion, the letter D being marked with ink or gunpowder on the left side of a deserter 2 inches below the armpit. This also has been abolished.

**BRANDY**, the liquor obtained by the distillation of wine, or of the refuse of the wine-press. It is colorless at first, but usually derives a brownish color from the casks in which it is kept or from coloring matters added to it. The best brandy is made in France, particularly in the Cognac district in the department of Charente. Much of the so-called brandy sold in Britain and America is made there from more or

less coarse whisky, flavored and colored to resemble the real article; and France itself also exports quantities of this stuff. Brandy is often used medicinally as a stimulant, stomachic, and restorative, or in mild diarrhoea. In America various distilled liquors get the name of brandy, as cider brandy, peach brandy.

**BRANDYWINE CREEK**, a small river which rises in the state of Pennsylvania, passes into the state of Delaware, and joins Christiana Creek near Wilmington. It gives its name to a battle fought near it, Sept. 11, 1777, between the British and Americans, in which the latter were defeated.

**BRANK**, or **BRANKS**, an instrument formerly in use in Scotland, and to some extent also in England, as a punishment for scolds. It consisted of an iron frame



Brank.

which went over the head of the offender, and had in front an iron plate which was inserted in the mouth, where it was fixed above the tongue, and kept it perfectly quiet.

**BRANT**, Joseph, a chief of the Mohawk tribe of Indians, born in 1742, died in 1807. His native name was Thayendanega. He became a convert to Christianity and helped the British in several of the Indian wars, and fought against the Americans during the revolution. His alleged exploits are recounted by Campbell in his *Gertrude of Wyoming*.

**BRASS** is an alloy of copper and zinc, of a bright-yellow color, and hard, ductile, and malleable. The best brass consists of two parts by weight of copper to one of zinc; but any degree of variation may be obtained by altering the proportions; thus by increasing the quantity of zinc we may form tombac and pinchbeck, and with nearly a seventh more of zinc than copper the compound becomes brittle and of a silver-white color. By increasing the copper, on the other hand, the compound increases in strength and tenacity. Brass which is to be turned or filed is made workable by mixing about 2 per cent of lead in the alloy, which has the effect of hardening the brass and preventing the tool being clogged. For engraving purposes a little tin is usually mixed with the brass. Brass is used for a vast variety of purposes, both useful and ornamental.

**BRASSES, SEPULCHRAL** or **MONUMENTAL**, large plates of brass inlaid in polished slabs of stone, and usually exhibiting the figure of the person intended to be commemorated, either in a carved outline on the plate or in the form of the plate itself. In place of

the figure we sometimes find an ornamented cross. The earliest example of these monumental slabs now existing is that on the tomb of Sir John D'Aber-



Brass—Westminster abbey.

non (died 1277) at Stoke D'Abernon in Surrey, England. These brasses are of great value in giving us an exact picture of the costume of the time to which they belong.

**BRASSEY**, Thomas, an English railway contractor, born 1805, died 1870. His operations were on an immense scale, and extended to most of the European countries, as well as to America, India, and Australia, one of his greatest works being the Grand Trunk Railway of Canada, with the great bridge over the St. Lawrence at Montreal. He left a very large fortune. His son, Thomas, born 1836, now Lord Brassey, has been admiral's secretary and civil lord, governor of Victoria, and writes on naval matters, etc. His first wife (died 1888) wrote *Voyage of the Sunbeam* and other books.

**BRAVO** (brä'vō), an Italian adjective used as exclamation of praise in theaters, meaning "well done! excellent!" The correct usage is to say bravo to a man, brava to a woman, bravi to several persons.

**BRAZIL**, United States of, a republic in S. America, occupying nearly one-half of that continent; greatest length, e. to w., 2630 miles; greatest length, n. to s., 2540 miles; area estimated at 3,124,000 square miles, or about one-sixth smaller than Europe. It is bounded s.e., e. and n.e. by the Atlantic Ocean, n. by French, Dutch, and British Guiana, and Venezuela; w. and s.w. by



Ecuador, Peru, Bolivia, Paraguay, the Argentine Republic, and the Republic of Uruguay. Brazil is divided politically into a federal district and twenty states. Pop. 14,333,915.

The coast has few indentations of importance—the chief being the estuaries of the Amazon and Para in the north—and good harbors are comparatively few. As a whole the country may be regarded as having three natural divisions, namely, one belonging to the basin of the Amazon, another belonging to the La Plata basin, and a third consisting of the eastern portion watered by a number of streams directly entering the Atlantic. The Amazon valley is bounded by elevated tablelands which, in the lower course of the river, approach within a comparatively short distance of each other. The characteristic feature of this region is its immense low-lying, forest-covered plains, intersected by innumerable water-courses, and in many parts subject to annual inundation, the vegetation being of the most luxuriant character, from the heat and frequent rains. The greater part of this vast region is unpopulated except by Indians, and as yet of little commercial importance. The climate, notwithstanding the tropical heat and moisture, is comparatively healthful, and the facility for commerce given by thousands of miles of great navigable streams must in time attract numerous settlers. This northern part of Brazil is unequalled in the number and magnitude of the streams which compose its river system and connect it with Venezuela, Colombia, Ecuador, Peru, and Bolivia. On the north side the chief affluents of the Amazon are the Rio Negro and the Japura, the former giving through the Cassiquiare continuous water communication with the Orinoco. Among the southern affluents which are important as water highways into the interior of Brazil are the Xingu, the Tapajos, the Maderia the Purus, and the Jurua; the Madeira being the most important, and forming a navigable waterway into Bolivia, except that it is interrupted by falls about 200 miles below where it enters Brazil. The Tocantins is another large stream from the south, which enters the Para estuary and hardly belongs to the Amazon basin. The forest region of the Amazon occupies about one-fourth of the empire; the rest is made up of undulating tablelands 1000 to 3000 feet above the sea, mountain ranges rising to 10,000 feet, and river valleys.

The great streams belonging to the La Plata basin, in the south, are the Paraguay and Parana. The water-shed between this and the Amazonian basin, near the western boundary of Brazil, is only about 500 feet above sea-level, and here a canoe can be hauled across from a head-stream of the Madeira to be launched on one belonging to the Paraguay. It would thus be easy to connect the one system with the other by means of a canal, and so connect the La Plata with the Orinoco. The water-shed rises gradually from west to east. The southern part of Brazil is characterized by its low plains or pampas, covered with grass or scrub. Its vegetation is

of a much less tropical character than in the Amazon basin, and its climate more variable. In many parts of this region there is an admirable field for future colonization, though it is as yet defective in means of transport. Near the coast, in the provinces of S. Paulo, Rio Grande, and Parana, there is already a considerable population, much augmented by German and Italian immigration, and mostly occupied in cattle-raising and agriculture. Railways also have been constructed and have given a great stimulus to trade.

The most important river in eastern Brazil is the San Francisco, which is the great waterway into its interior, and after a course of 1800 miles discharges its waters into the Atlantic at San Antonio. The three greatest cities of Brazil, Rio de Janeiro, Pernambuco, and Bahia, are all endeavoring to develop a traffic in connection with this river. A state line has now been constructed round the falls of Pedro Affonso on its lower course, and thus brought the traffic of the upper river into communication with the lower. Eastern Brazil exhibits a great variety in surface, climate, and productions, and though large tracts consist of arid and sandy tablelands, it contains within itself the greater part of the population, wealth, and industry of the empire.

The chief mountain ranges are near the southeastern coast. The Serra do Mar or Maritime range commences in the far south, and travels close to the coast-line in a northeasterly direction till it reaches Rio de Janeiro and Cape Frio, where it culminates in the Serra dos Orgaos, or Organ Mountains, from 7000 to 8000 feet above the sea, and forming the noblest element in the marvelous scenery of the bay of Rio de Janeiro. West of the Serra do Mar lies the Serra Mantiqueira, which farther north is known as the Serra do Espinhaço. Here are the loftiest summits in Brazil, Itatiaia-Assu, the highest of all, being 10,040 feet above the sea. Between the sources of the Tocantins and Parana are the Montes Pyreneos, the second most elevated ridge in Brazil, some of its heights being estimated at nearly 8000 and 10,000 feet above the level of the sea.

As almost the whole of Brazil lies s. of the equator, and in a hemisphere where there is a greater proportion of sea than land, its climate is generally more cool and moist than that of countries in corresponding latitudes in the northern hemisphere. In the s. parts of Brazil, in consequence of the gradual narrowing of the continent, the climate is of an insular character—cool summers and mild winters. The quantity of rain differs widely in different localities. The n. provinces generally are subject to heavy rains. At Rio, where the climate has been much modified by the clearing away of the forests in the neighborhood, the mean temperature of the year is 74°. At Pernambuco the temperature rarely exceeds 82°; in winter it descends to 68°. Generally the climate of Brazil is delightful.

Only an insignificant portion of Brazil is as yet under cultivation. The pastures are of vast extent, and support

great herds of horned cattle, one of the principal sources of the wealth of the country. The chief food-supplying plants are sugar, coffee, cocoa, rice, tobacco, maize, wheat, manioc (or cassava), beans, bananas, ginger, yams, lemons, oranges, figs, etc.—the two first, sugar and coffee, being the staple products of the empire. As much coffee, indeed, is produced in Brazil as in all the rest of the world together. In its forests Brazil possesses a great source of wealth. They yield dyewoods and fancy woods of various kinds, including Brazil-wood, rosewood, fustic, cedar, mahogany, and a variety of others, as also Brazil-nuts, coconuts, vegetable ivory, india-rubber, copaiba, arnotto, piassava fiber, etc. Other vegetable products are vanilla, sarsaparilla, ipecacuanha, cinnamon, and cloves.

The principal domestic animals of Brazil are horned cattle and horses. Sheep are kept only in some parts, chiefly in the south. Goats and hogs are abundant. The wild animals comprise the puma, jaguar, sloth, porcupine, etc. Monkeys are numerous. Among the feathered tribes are the smallest, the humming-bird, and one of the largest, the rhea, parrots in great variety, tanagers, toucans, and the harpy eagle. The reptiles consist of the boa-constrictor and other species of serpents, some of them venomous, alligators, and fresh-water turtle, the eggs of which yield a valuable oil. The insects are, many of them, remarkable for the beauty of their colors and their size, especially the butterflies. Among minerals the diamonds and other precious stones of Brazil—emeralds, sapphires, rubies, beryls, etc. Gold also is procured in considerable quantities. Other minerals are quicksilver, copper, manganese, iron, lead, tin, antimony, and bismuth. The shores and rivers abound with fish.

The population of Brazil consists of whites, Indians, negroes, and people of mixed blood. The negroes are over 2,000,000 in number, and till 1888 were partly slaves. Of the Indians some are semi-civilized, but others (estimated at 600,000) roam about in a wild state, and are divided into a great many tribes speaking different languages. The state language is Portuguese. Primary education is gratuitous, but the great majority of the people are illiterate, though education is now compulsory in some provinces.

The principal imports are cottons, linens, woollens, machinery, hardware and cutlery, wheat, flour, wine, coals, etc., the manufactured articles and coals being largely from Britain. The exports consist of coffee, sugar, cotton, hides, cabinet and dye woods, drugs, caoutchouc, and diamonds.

The prevailing religion of Brazil is the Roman Catholic, but all religions are now on an equal footing. Previous to 1889 the government was monarchical, but in that year a revolution took place and a republic was established. By the new constitution of 1891 each of the old provinces forms a state, having its own local government, with representation in a congress appointed by popular vote, and consisting of a senate and a



chamber of deputies. The standing army numbers about 30,000. The navy comprises eleven iron-clads, besides other vessels.

Brazil was discovered in 1499 by Vincente Yanez Pinçon, one of the companions of Columbus in the service of Spain, and next year was taken possession of by Pedro Alvares de Cabral on behalf of Portugal. The first governor-general was Thome de Sousa, who in 1549 arrived in the Bay of Bahia and established the new city of that name, making it the seat of his government. The usurpation of the crown of Portugal by Philip II. left Brazil in a defenseless and neglected condition, and the English, French, and Dutch made successive attempts to obtain a footing. The Dutch were the most persevering, and for a time almost divided the Brazilian territory with the Portuguese. The tyranny of the Dutch governors, however, incited their native and Portuguese subjects to revolt, and after a sanguinary war, in 1654 the Dutch were driven out and the Portuguese remained masters of an undivided Brazil. The value of Brazil to Portugal continued steadily to increase after the discovery of the gold mines in 1698 and the discovery of the diamond mines in 1728. The vigorous policy of the Portuguese government under the administration of the Marquis de Pombal (1760-77) did much to open up the interior of Brazil, though his high-handed modes of procedure left among the Brazilians a discontent with the home government which took shape in the abortive revolt of 1789. On the invasion of Portugal in 1808 by the French the sovereign of that kingdom, John VI., sailed for Brazil, accompanied by his court and a large body of emigrants. He raised Brazil to the rank of a kingdom, and assumed the title of King of Portugal and Brazil. But on his return to Portugal in 1820 he found the Portuguese Cortes unwilling to grant civil and political equality to the Brazilians—a fact which raised such violent convulsions in Rio Janeiro and other parts of Brazil that Dom Pedro, the king's son, was forced to head the party resolved to make Brazil independent, and in 1822 a national assembly declared the separation of Brazil from Portugal, and appointed Dom Pedro the constitutional emperor. In 1864 began a severe struggle between Brazil and Paraguay, caused principally by the arbitrary conduct of Lopez, the dictator of Paraguay. Brazil, though joined by Uruguay and the Argentine Confederation, had to bear the brunt of the war, which terminated only with the death of Lopez in 1870. This struggle was attended with an immense expenditure of men and money to Brazil, but it established her reputation as a great power, and secured the freedom of the navigation of the La Plata river-system. In 1871 an act was passed for the gradual emancipation of slaves, and in 1888 slavery was finally abolished. In 1889 took place the revolution and establishment of the republic. The proceedings of the president, Fonseca, led to a revolutionary movement in 1891, which was not quelled without difficulty.

**BRAZIL-NUT**, the fruit of a South American tree, native to Guiana, Venezuela, and Brazil. The fruit is nearly round, about 6 inches in diameter, has a hard shell, and contains a number of seeds, from twenty to twenty-four, wrinkled, triangular and which are pleasant to the taste and are used as a dessert. An oil is also extracted from them.

**BRAZIL-WOOD**, a kind of wood yielding a red dye, obtained from several trees, natives of the West Indies and Central and South America. The wood is hard and heavy, and as it takes on a fine polish it is used by cabinet-makers for various purposes, but its principal use is in dyeing red. The dye is obtained by reducing the wood to powder and boiling it in water, when the water receives the red coloring principle, which is a crystallizable substance called brazilin. The color is not permanent unless fixed by suitable mordants.

**BRAZOS** (brä'zōs), a large river, in Texas, rising in the n.w. part of the state, and flowing into the Gulf of Mexico, after a course of 900 miles, 40 miles w.s.w. Galveston. During the rainy season, from February to May inclusive, it is navigable by steamboats for about 300 miles.

**BREACH**, the aperture or passage made in the wall of any fortified place by the ordnance of the besiegers for the purpose of entering the fortress.—Breaching batteries are batteries of heavy guns intended to make a breach.

**BREACH**, in law, any violation of a law, or the non-performance of a duty imposed by law.—Breach of Peace is an offense against the public safety or tranquillity either personally or by inciting others. Breaches of peace are such as affrays, riots, routs, and unlawful assemblies, forcible entry or detainer by violently taking or keeping possession of lands or tenements with menaces, force, and arms; riding, or going, armed with dangerous or unusual weapons, terrifying people; challenging another to fight, or bearing such a challenge, besides certain other offenses.—Breach of Promise (of marriage), the failure to implement one's promise to marry a particular person, in consequence of which that person may raise an action for damages, though it is only the woman as a rule that gains damages.—Breach of Trust is a violation of duty by a trustee, executor, or any other person in a fiduciary position, as, for instance, when a trustee manages an estate entrusted to him for his own advantage rather than for that of the trust.

**BREAD** is the flour or meal of grain kneaded with water into a tough and consistent paste and baked. There are numerous kinds of bread, according to materials and methods of preparation; but all may be divided into two classes: fermented, leavened, or raised, and unfermented, unleavened, not raised. The latter is the simplest, and no doubt was the original kind, and is still exemplified by biscuits, the oat cakes of Scotland, the corn-bread of America, the dampers of the Australian colonies, and the still ruder bread of

savage races. It was probably by accident that the method of bringing the paste into a state of fermentation was found out, by which its toughness is almost entirely destroyed, and it becomes porous, palatable, and digestible. All the cereals are used in making bread, each zone using those which are native to it. Thus maize, millet, and rice are used for the purpose in the hotter countries, rye, barley, and oats in the colder, and wheat in the intermediate or more temperate regions. In the most advanced countries bread is made from wheat, which makes the lightest and most spongy bread. The fermentation necessary for the ordinary loaf-bread is generally produced by means of leaven or yeast. The chemical changes that take place during the process of making bread may be explained in the following way: An average quality of flour consists of gluten 12, starch 70, sugar 5, gum 3, water 10; total, 100. When water is added to the flour, in the first operation of baking, it unites with the gluten and starch, and dissolves the gum and sugar. The yeast or barm added acts now upon the dissolved sugar, especially at an elevated temperature, and produces the vinous fermentation, forming alcohol and setting free carbonic acid as a consequence of the transformation of the elements of the sugar. The gaseous carbonic acid is prevented from escaping by the gluten of the mass, and if the mixing or kneading has been properly performed it remains very equally diffused through every part of the dough. The alcohol and carbonic acid are carried into the oven with the dough, and the former partially escapes, while the latter gas, being expanded by the heat, produces the lightness and sponginess of the loaf.

It may be produced in bread-making by other means than fermentation, as by some of those well-known preparations called "baking powders," which usually contain bicarbonate of potash or of soda, with tartaric acid. Aërated bread is so called because made with aërated water—that is, water strongly impregnated with carbonic acid under pressure, the dough being also worked up under pressure and caused to expand by the carbonic acid when the pressure is removed.

The several qualities of flour used for bread-making are known by the names of firsts or whites, seconds or households, and thirds, according to the degree of fineness resulting from the process of bolting or dressing. The latter two contain a certain proportion of the bran. Brown or whole-flour bread is considered to be very wholesome. It is made from undressed wheat, and consequently contains the bran as well as the flour.

Various adulterations are found in bread, such as chalk, starch, potatoes, etc.; but the commonest is alum, which enables the baker to give to bread of inferior flavor the whiteness of the best bread, and also to keep in the loaf an undue quantity of water, which, of course, increases its weight. Boiled rice also is used for the same purpose. In the making of bread the flour or meal of wheat, barley, rye, oats, buckwheat, Indian corn, rice, beans, peas, and



potatoes may be used, along with salt, eggs, water, milk, and leaven or yeast of any kind; but any other ingredient is regarded as an adulteration.

**BREADFRUIT**, a large globular fruit of a pale-green color, about the size of a child's head, marked on the surface with irregular six-sided depressions, and containing a white and somewhat fibrous pulp, which when ripe be-



Breadfruit.

comes juicy and yellow. The tree that produces it grows wild in Otaheite and other islands of the South Seas, whence it was introduced into the West Indies and S. America. It is about 40 feet high, with large and spreading branches, and has large bright-green leaves deeply divided into seven or nine spear-shaped lobes. The fruit is generally eaten immediately after being gathered, but is also often prepared so as to keep for some time either by baking it whole in close underground pits or by beating it into paste and storing it underground, when a slight fermentation takes place. The eatable part lies between the skin and the core, and is somewhat of the consistence of new bread. Mixed with cocoanut milk it makes an excellent pudding. The inner bark of the tree is made into a kind of cloth. The wood is used for the building of boats and for furniture.

**BREADNUTS**, the seeds of a tree of the same order as the breadfruit. The breadnut tree is a native of Jamaica. Its wood, which resembles mahogany, is useful to cabinet-makers, and its nuts make a pleasant food, in taste not unlike hazelnuts.

**BREAK WATER**, a work constructed in front of a harbor to serve as a protection against the violence of the waves. The name may also be given to any structure which is erected in the sea with the object of breaking the force of the waves without and producing a calm within. Breakwaters are usually constructed by sinking loads of unwrought stone along the line where they are to be laid, and allowing them to find their angle of repose under the action of the waves. When the mass rises to the surface, or near it, it is surmounted with a pile of masonry, sloped outward in such a manner as will best enable it to resist the action of the waves.

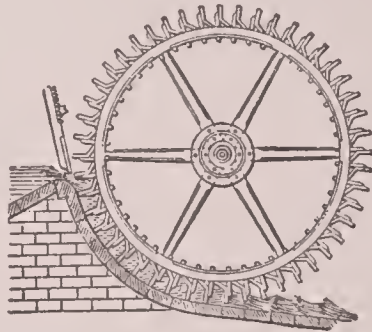
**BREAMING**, a nautical term meaning the operation of clearing a ship's bottom by means of fire of the shells, seaweeds, barnacles, etc., that have

become attached to it. It is performed by holding to the hull kindled furze, reeds, or such like light combustibles, so as to soften the pitch and loosen the adherent matters, which may be then easily swept off.

**BREAST**, The female, is of a glandular structure, containing vesicles for the secretion of milk, and excretory ducts, which open by small orifices in the nipple, and discharge the secreted fluid for the nourishment of the child. At the center of each breast there is a small projection, the nipple, and this is surrounded by a dark ring termed the areola. The breast is liable to many diseases, from irritation during nursing, bruises of the part, undue pressure from tight clothes, and from constitutional causes. Among the most common of these is inflammation arising from a superabundant secretion of milk during nursing.

**BREASTPLATE**, a piece of defensive armor covering the breast, made of leather, brass, iron, steel, or other metals. Among the ancient Jews the name was given to a folded piece of rich, embroidered stuff worn by the high-priest. It was set with twelve precious stones bearing the names of the tribes.

**BREAST-WHEEL**, a water-wheel in which the water driving it is delivered to the float-beards between the top and



Breast-wheel.

bottom, generally a little below the level of the axis. In this kind of wheel the water acts partly by impulse, partly by weight.

**BREASTWORK**, in the military art, a hastily-constructed parapet made for protection against the shot of the enemy, generally of earth.

**BREATH**, the air which issues from the lungs during respiration through the nose and mouth. A smaller portion of oxygen and a larger portion of carbonic acid are contained in the air which is exhaled than in that which is inhaled. There are also aqueous particles in the breath, which are precipitated by the coldness of the external air in the form of visible vapor; likewise other substances which owe their origin to secretions in the mouth, nose, windpipe, and lungs. These cause the changes in the breath which may be known by the smell. A bad breath is often caused by local affections in the nose, the mouth, or the windpipe; viz., by ulcers in the nose, cancerous polypi, by discharges from the mouth, by sores on the lungs, or peculiar secretions in them. It is also caused by rotten teeth, by impurities in the mouth, and by some kinds of food. The remedies of course

vary. Frequent washing, gargles of chlorine-water, charcoal, etc., are prescribed according to the disease.

**BREATHING**. See Respiration.

**BRECKENRIDGE**, John Cabell, an American soldier, statesman, and politician, born in Kentucky in 1821, died in 1875. He was elected vice-president of the U. States with Buchanan, and in 1860 was nominated by the southern section of the democracy for president, but, with Douglas, was defeated by Lincoln. Elected to the senate, he resigned, entered the Confederate military service, and fought at many of the principal battles of the civil war, subsequently becoming a member of the cabinet of Jefferson Davis. After the war he practiced law.

**BREECH, BREECH-LOADING**. The breech is the solid mass of metal behind the bore of a gun, and that by which the shock of the explosion is principally sustained. In breech-loading arms the charge is introduced here, there being a mechanism by which the breech can be opened and closed. In small arms the advantages of breech-loading for rapidity of fire, facility of cleaning, etc., recommended it to general use, and its efficacy for military purposes was effectively demonstrated by the Prussian campaigns against Denmark and Austria in 1864 and 1866. Since that time every government has adopted the new system, both in small-arms and heavy ordnance, while breech-loading sporting-arms are also in general use. The chief difficulty in breech-loading is to close the breech so as to prevent the escape of the highly elastic gas to which the force of the explosion is due, but the appliances of modern science and mechanical art may be said to have effectually met this difficulty. See Cannon, Musket, etc.

**BREECHES**, an article of clothing for the legs and lower part of the body in use among the Babylonians and other ancient peoples as well as among the moderns. In Europe we find them first used among the Gauls; hence the Romans called a part of Gaul breeched Gaul. Trousers are longer and looser than the breeches that used to be worn.

**BREECHING**, a rope used to secure a ship's gun and prevent it from recoiling too much in battle.

**BREEDING**, the art of improving races or breeds of domestic animals, or modifying them in certain directions, by continuous attention to their pairing, in conjunction with a similar attention to their feeding and general treatment. Animals (and plants no less) show great susceptibility of modification under systematic cultivation; and there can be no doubt that by such cultivation the sum of desirable qualities in particular races has been greatly increased, and that in two ways. Individual specimens are produced possessing more good qualities than can be found in any one specimen of the original stock; and from the same stock many varieties are taken characterized by different perfections, the germs of all of which may have been in the original stock but could not have been simultaneously developed in a single specimen. But when an effort is made to develop rapidly, or to



**BREWING,** the process of extracting a saccharine solution from malted grain and converting the solution into a fermented and sound alcoholic beverage called ale or beer. The preliminary process of malting (often a distinct business to that of brewing) consists in promoting the germination of the grain for the sake of the saccharine matter into which the starch of the seed is thus converted. The barley or other grain is steeped for about two days in a cistern and then piled in a heap, or couch, which is turned and re-turned until the radicle or root, and acrospire or rudimentary stem, have uniformly developed to some little extent in all the heap of grain. This treatment lasts from seven to ten days, by which time the grain has acquired a sweet taste; the life of the grain being then destroyed by spreading the whole upon the floor of a kiln to be thoroughly dried. At this point begins the brewing process proper, which in breweries is generally as follows: The malt is crushed or roughly ground in a malt-mill, whence it is carried to the mashing-machine, and there thoroughly mixed with hot water. The mixture is now received by the mash-tun—a cylindrical vessel with a false perforated bottom held about an inch from the true one. In the mash-tun the useful elements are extracted from the malt in the form of the sweet liquor known as wort, and the tun, therefore, is fitted with an elaborate system of revolving rakes for thoroughly mixing



the malt with hot water. The mixing completed, the mash-tun is covered up and allowed to stand for about three hours, when the taps in the true bottom are opened and the wort or malt-extract run off. The wort being drained into a copper the hops are now added, and the whole boiled for about two hours, the boiling, like the addition of hops, tending to prevent acetous and putrefactive fermentation. When sufficiently boiled the contents of the copper are run into the hop-back—a long rectangular vessel with a false bottom 8 or 9 inches from the true bottom. The hot wort leaving the spent hops in the hop-back runs through the perforations in the false bottom and thence into the cooler—a large flat vessel where the worts are cooled to about 100° Fah. From the cooler the liquor is admitted to the refrigerator—a shallow rectangular vessel, which reduces the temperature to almost that of the cold water, or about 58°. The worts are next led by pipes into the large wooden fermenting tuns, where yeast or barm is added as soon as the wort begins to run in from the refrigerator. During the operation of fermentation, by which a portion of the saccharine matter is converted into alcohol, the temperature rises considerably, and requires to be kept in check by means of a coil of copper piping with cold water running through it lowered into the beer. When the fermentation has gone far enough, and the liquor has been allowed to settle, the beer becomes comparatively clear and bright, and may be run off and filled into the trade casks or into vats.

**BREWSTER**, Benjamin Harris, an American lawyer, born in New Jersey in 1816, died in 1888. From 1881 to 1885 he was attorney-general of the U. States, prosecuting the famous Star Route trials for fraud.

**BREWSTER**, Sir David, natural philosopher, born in Jedburgh 1781. In 1808 he became editor of the *Edinburgh Encyclopædia*, and in 1819 was one of the founders of the *Edinburgh Philosophical Journal*, of which he was sole editor from 1824–32. Brewster was one of the founders of the British Association, and its president in 1850. In 1832 he was knighted and pensioned, and both before and after this time his services to science obtained throughout Europe the most honorable recognition. From 1838 to 1859 he was principal of the united colleges of St. Leonard's and St. Salvador at St. Andrews, and in the latter year was chosen principal of the University of Edinburgh—an office which he held till his death in 1868. Among his inventions were the "polyzonal lens" (introduced into British lighthouses in 1835), the kaleidoscope, and the improved stereoscope.

**BRI'AN**, a famous chieftain of the early Irish annals, who succeeded to Munster in 978, defeated the Danes of Limerick at Waterford, attacked Malachi, nominal king of the whole island, and became king in his stead (1002). He was slain at the close of the battle of Clontarf, near Dublin, in 1014, after gaining a signal victory over the revolted Maelmora and his Danish allies.

**BRIANCON** (brē-ān-sōn). A town and fortress of France, department of Hautes-Alpes, on the right bank of the Durance. It occupies an eminence 4284 ft. above the sea level and is called the Gibraltar of the Alps. Pop. 3,579.



Briançon.

**BRIAR, BRIER**, the wild rose. The well-known briar-root tobacco-pipes are made from the root of a large kind of heath, a native of southern Europe, Corsica, Sardinia, Algeria, etc.

**BRIBE**, a reward given to a public officer or functionary to induce him to violate his official duty so as to suit the person bribing; especially a corrupt payment of money for the votes of electors in the choice of persons to places of trust under government. Bribery is in most countries regarded as a crime deserving severe punishment.

**BRICK**, a sort of artificial stone, made principally of argillaceous earth formed in molds, dried in the sun, and baked by burning, or, as in many Eastern countries, by exposure to the sun. Sun-dried bricks of great antiquity have been found in Egypt, Assyria, and Babylonia, and in the mud walls of old Indian towns. Under the Romans the art of making and building with bricks was brought to great perfection, and the impressions on Roman bricks, like those on the bricks of Babylonia, have been of considerable historic value. The Roman brick was afterward superseded in England by the smaller Flemish make. Of the various clays used in brickmaking, the simplest, consisting chiefly of silicates of alumina, are almost infusible, and are known as fire-clays. Of such clays fire-bricks are made. Clays containing lime and no iron burn white, the colors of others being due to the presence in varying proportions of ferric oxide, which also adds to the hardness of bricks. The clay should be dug in autumn and exposed to the influence of frost and rain. It should be worked over repeatedly with the spade and tempered to a ductile homogeneous paste, and should not be made into bricks until the ensuing spring. The making of bricks by hand in molds is a simple process. After being made and dried for about nine or ten days they are ready for the burning, for which purpose they are formed into kilns, having flues or cavities at the bottom for the insertion of the fuel, and interstices between them for the fire and hot air to penetrate. Much care is necessary in regulating the fire, since too much heat vitrifies the bricks and too little leaves them soft and friable. Bricks are now largely made by machines of

various construction. In one the clay is mixed and comminuted in a cylindrical pug-mill by means of rotatory knives or cutters working spirally and pressing the clay down to the bottom of the cylinder. From this it is conveyed by rollers and forced through an opening of the required size in a solid rectangular stream, which is cut into bricks by wires working transversely. Machine-made bricks are heavier, being less porous than hand-made bricks, and are more liable to crack in drying; but they are smoother, and, when carefully dried, stronger than the hand-made.

Bricks were made in Virginia as early as 1612, in New England in 1647, and in Philadelphia in 1685. The various kinds of brick made in the U. States at present are as follows: Common brick; stock, or pressed, or front brick, of prime clay and very smooth; enameled or glazed brick; ornamental brick, variously formed; fire brick, from refractory clays; paving and vitrified brick, of specially hard quality.

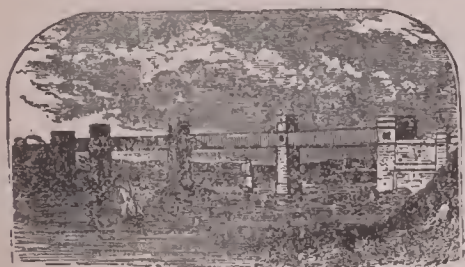
**BRIDEWELL**, a name given, in the U. States, to penal work-houses, or minor prisons where the prisoners are required to do hard labor. The name originates from a well in London named for St. Bride. The name Bridewell came to be applied to a palace in the vicinity, which was afterward used as a house of correction. The original building was destroyed in 1864.

**BRIDGE**, a structure of stone, brick, wood, or iron, affording a passage over a stream, valley, or the like. The earliest bridges were no doubt trunks of trees. The arch seems to have been unknown among most of the nations of antiquity. Even the Greeks had not sufficient acquaintance with it to apply it to bridge-building. The Romans were the first to employ the principle of the arch in this direction, and after the construction of such a work as the great arched sewer at Rome, the Cloaca Maxima, a bridge over the Tiber would be of comparatively easy execution. One of the finest examples of the Roman bridge was the bridge built by Augustus over the Nera at Narni, the vestiges of which still remain. It consisted of four arches, the longest of 142 feet span. The most celebrated bridges of ancient Rome were not generally, however, distinguished by the extraordinary size of their arches, nor by the lightness of their piers, but by their excellence and durability. Old London Bridge was commenced in 1176, and finished in 1209. It had houses on each side like a regular street till 1756–58. In 1831 it was altogether removed, the new bridge, which had been begun in 1824, having then been finished.

Stone bridges consist of an arch or series of arches, and in building them the properties of the arch, the nature of the materials, and many other matters have to be carefully considered. It has been found that in the construction of an arch the slipping of the stones upon one another is prevented by their mutual pressure and the friction of their surfaces; the use of cement is thus subordinate to the principle of construction in contributing to the strength and maintenance of the fabric.



The first iron bridges were erected from about 1777 to 1790. The same general principles apply to the construction of iron as of stone bridges, but the greater cohesion and adaptability of the material give more liberty to the architect, and much greater width of span is possible. At first iron bridges were erected in the form of arches, and the material employed was cast-iron; but the arch has now been generally superseded by the beam or girder, with its numerous modifications; and wrought-iron or steel is likewise found to be much better adapted for resisting a great tensile strain than cast-metal. Numerous modifications exist of the beam or



- 1, Suspension-bridge, Chelsea.
- 2, Lattice bridge on railway from St. Gall to Appenzell.
- 3, The Britannia tubular bridge.

girder, as the lattice-girder, bow-string-girder, etc.; but of these none is more interesting than the tubular or hollow girder, first rendered famous from its employment by Robert Stephenson in the construction of the railway bridge across the Menai Strait, and connecting Anglesey with the mainland of North Wales. This is known as the Britannia Tubular Bridge. The Victoria Bridge over the St. Lawrence at Montreal, originally tubular, is no longer so, the upper portion having been reconstructed with an open track. It is nearly two miles in length, or about five and a half times as long as the bridge across the Menai Strait. A girder railway bridge across the Firth of Tay at Dundee was opened in 1887, being the second built at the same place, after the first had given way in a great storm. It is 2 miles 73 yds. long, has 85 spans, is 77 feet high, and carries two lines of rails.

The bridge over the Firth of Forth, at Queensferry, completed in 1889, has two chief spans of 1710 feet, two others of 680 feet, fifteen of 168 feet, and seven small arches, and the bridge gives a clear headway for navigation purposes of 150 feet above high-water of spring-tides. The great spans consist of a cantilever at either end, 680 feet long, and a central girder of 350 feet. Both the above bridges carry the lines of the N. British Railway. The Crumlin Railway Viaduct, S. Wales, having lattice-girders supported on open-work piers, is more remarkable for height than length, being 200 feet high.

Suspension-bridges, being entirely independent of central supports, do not interfere with the river, and may be erected where it is impracticable to build bridges of any other kind. The entire weight of a suspension-bridge rests upon the piers at either end from which it is suspended, all the weight being below the points of support. Such bridges always swing a little, giving a vibratory movement which imparts a peculiar sensation to the passenger. The modes of constructing these bridges are various. The roadway is suspended either from chains or from wire-ropes, the ends of which require to be anchored, that is, attached to the solid rock or masses of masonry or iron. One of the earlier of the great suspension-bridges is that constructed by Telford over the Menai Strait near the Britannia Tubular Bridge, finished in 1825; the opening between the points of suspension is 580 feet. The Hammersmith Chain-bridge, the Union Suspension-bridge near Berwick, and the suspension-bridge over the Avon at Clifton are other British examples. On the European continent, the Fribourg Suspension-bridge in Switzerland, span 870 feet, erected 1834, is a celebrated work; as is that over the Danube connecting Buda with Pesth. In America the lower suspension-bridge over the Niagara, 7 miles below the falls, supported by wire cables, is 822 feet long; it has two floors or roadways connected together but 15 feet apart, the lower serving for ordinary traffic, the upper carrying three lines of rails, 245 feet above the river. Another bridge, close to the falls, has a span of 1250 feet. The Cincinnati bridge over the Ohio has a span of 1057 feet. A suspension-bridge of great magnitude, connecting the city of New York with Brooklyn, was opened in 1883. The central or main span is 1595½ feet from tower to tower, and the land spans between the towers and the anchorages 930 feet each; the approach on the New York side is 2492 feet long, and that on the Brooklyn side 1901 feet, making the total length 5989 feet. The height of the platform at the center is 135 feet above high-water, and at the ends 119 feet. The roadway is 85 feet broad, and is divided into five sections, the two outside for vehicles, the two inner for tram-cars, and the middle one, 12 feet above the rest, for foot-passengers. Of recent devices the most useful is that of the counterpoise bridge, or jackknife bridge, which is lifted up from one end or from the middle by counterweights.

**BRIDGE**, a game of cards played by four players and one pack of 52 cards. The players are known as the leader, the dummy, the pone, and the dealer. One of the varieties of bridge is called bridge-whist.

**BRIDGE**, Ship's, a raised walk on the forward end of a ship, patrolled by the officer in charge.

**BRIDGE'MAN**, Laura, a blind deaf-mute, born in Hanover, New Hampshire, in 1829. Till the age of two years she was a bright active child, when a severe illness deprived her of the senses of sight, hearing, and smell, and partly also of that of taste. She was put under the care of Dr. Howe of Boston, and the history of the methods by which she was gradually taught to read, write, and eventually perform most of the ordinary duties and even some of the accomplishments of life, is a very interesting one. She became herself a teacher of persons similarly afflicted, and led an active and useful life, dying in 1889.

**BRIDGE'PORT**, a seaport of Connecticut, 58 miles n.e. of New York, on an arm of Long Island Sound, with a large coasting trade, but chiefly supported by its manufactories, including the large sewing-machine factories of Wheeler, Wilson & Co., Elias Howe, etc. Pop. 84,216.

**BRIDGETON** (brij' tun), a city, port of entry, and county-seat of Cumberland Co., N. J., 38 miles south of Philadelphia, at the head of navigation on the Cohansey river, and on the New Jersey Central and the West Jersey and Seashore railroads. Pop. 15,418.

**BRIDGETOWN**, the capital of the island of Barbados, in the West Indies, extending along the shore of Carlisle Bay, on the s.w. coast of the island, for nearly 2 miles. Bridgetown is the residence of the governor-general of the Windward Islands. Pop. 25,000.

**BRIDG'MAN**, Elijah Coleman, an American missionary to China, born in Massachusetts in 1801, died in 1861. In 1829 he went to China as a missionary and founded a mission at Shanghai.

**BRIDGMAN**, Frederick Arthur, an American painter, born at Tuskegee, Ala., in 1847. He exhibited in Paris in 1878 and was made a Chevalier of the Legion of Honor. In 1900 two of his paintings were exhibited at the Paris Exposition.

**BRIDGMAN**, Herbert Lawrence, an American explorer, born in Massachusetts in 1844. He accompanied Peary in his expedition of 1894, and in 1899 he commanded the auxiliary Peary expedition on the ship *Diana*.

**BRIEF**, which comes from the Latin *brevis*, short, denotes a brief or short statement or summary, particularly the summary of a client's case which the solicitor draws up for the instruction of counsel. A brief may also mean, in law, an order emanating from the superior courts. A papal brief is a sort of pastoral letter in which the pope gives his decision on some matter which concerns the party to whom it is addressed. The brief is an official document, but of a less public character than the bull.

**BRIG**, a sailing vessel with two masts rigged like the foremast and mizzen-



mast of a full-rigged ship. See Brigantine.

**BRIGADE'**, in general an indeterminate number of regiments or squadrons. A number of brigades form a division, and several divisions an army corps. A brigadier or brigadier-general is the officer who commands a brigade. See Army.



Brig.

**BRIGADIER-GENERAL**, an army officer who commands a brigade of soldiers. See Army, and Brigade.

**BRIG'ANTINE**, a sailing vessel with two masts, the foremast rigged like a brig's, the main-mast rigged like a schooner's. Called also hermaphrodite brig.

**BRIGHT**, John, a great English orator and politician, born at Greenbank, near Rochdale, Lancashire, Nov. 16, 1811. He first became known as a leading spirit along with Mr. Cobden in the Anti-Corn-Law League. In 1843 he was chosen M.P. for Durham, and distinguished himself as a strenuous advocate of free-trade and reform. In 1847 he sat for the first time for Manchester,



John Bright.

but in 1857 his opposition to the Crimean war had made him so unpopular in the constituency that he lost his seat by a large majority. He was, however, returned for Birmingham, and soon after made speeches against the policy of great military establishments and wars of annexation. In 1865 he took a leading part in the movement for the extension of the franchise, and strongly advocated the necessity of reform in Ireland. In the Gladstone ministry formed in 1868 he was President of the Board of Trade and afterward Chancellor of the Duchy of Lancaster, and he held the

latter office again under Mr. Gladstone in 1880-82. In 1886 he joined the Liberals who opposed Mr. Gladstone's schemes for Ireland, and contributed by his letters and influence to the overthrow of the Gladstone party. He was a member of the Society of Friends. He died March 27, 1889.

**BRIGHTON** (brī'tun), a county borough and favorite watering-place in England, county of Sussex, 50½ miles from London. In front of the town is a massive sea-wall, with a promenade and drive over 3 miles in length, one of the finest in Europe. Among the remarkable buildings, all of modern date, is the Pavilion, built by George IV., which cost upward of \$5,000,000. It is in the oriental style, with numerous cupolas, spires, etc. The building and its gardens, which are open to the public as pleasure-grounds, cover 9 acres. There is a very large and complete aquarium, and a fine iron pier. Brighton has no manufactures, and is resorted to chiefly as a watering-place. It was about the middle of the 18th century that Dr. Russell, an eminent physician, drew attention to Brighton, which subsequently was patronized by George IV., then Prince of Wales; in this way it was converted from a decayed fishing village into a fashionable and populous watering place. It has sent two members to parliament since 1832. Pop. 153,393.

**BRIGHT'S DISEASE**, a name (derived from a Dr. Bright of London, who first described the disorder) given to various forms of kidney disease, especially to that which is characterized by a granular condition of the cortical part of the kidneys and inflammation of the malpighian bodies. The urine during life contains albumen, and is of less specific gravity than natural. The disease is accompanied with uneasiness or pain in the loins, pale or cachectic countenance, disordered digestion, frequent urination, and dropsy. The blood contains urea, and is deficient in albumen and corpuscles. Progressive blood-poisoning induces other visceral diseases, and in the end gives rise to the cerebral disturbance which is the frequent cause of death.

**BRIMSTONE**, a name of sulphur. Sulphur, in order to purify it from foreign matters, is generally melted in a close vessel, allowed to settle, then poured into cylindrical molds, in which it becomes hard, and is known in commerce as roll brimstone.

**BRINE**, water saturated with common salt. It is naturally produced in many places beneath the surface of the earth, and is also made artificially, for preserving meat, a little saltpeter being generally added to the solution.

**BRISBANE**, the capital of Queensland, about 25 miles by water from the mouth of the river Brisbane, which intersects the town. Brisbane was originally settled, in 1825, as a penal station by Sir Thomas Brisbane (whence the name of the town). In 1842 the district was opened to free settlers, and on the erection of Queensland into a separate colony in 1859, Brisbane became the capital. Since then it has made great progress, and now possesses many fine public buildings, such as the Houses

of Legislature, the town-hall and the Albert Hall, the viceregal lodge, the post and telegraph offices, etc. There are also botanical gardens, several public parks, etc. The climate is tropical,



the annual rainfall about 55 inches. The town is the terminus of the western and southern railway system, and the port is the principal one in the colony. Pop. (with suburbs), 119,428.

**BRISBANE**, General Sir Thomas MacDougall, a Scotch soldier and astronomer, born in 1773. After serving in Flanders and the West Indies he commanded a brigade under the Duke of Wellington during the Peninsular war, and took part in the battles of Victoria, Orthes, and Toulouse. In 1821 he was appointed governor of New South Wales, where his administration tended greatly to promote the prosperity of the colony. At the same time he devoted himself to astronomy, and from his observatory at Paramatta catalogued 7385 stars, until then scarcely known. On his return to Scotland he continued his astronomical pursuits, and died in 1860.

**BRISSOT** (brē-sō), Jean Pierre, a French political writer, born in 1754, executed 30th October, 1793. He early turned his attention to public affairs, associating himself with such men as Pétion, Robespierre, Marat, etc. During the revolution he made himself known as a politician and one of the leaders of the Girondist party. The extreme views of the men of the "Mountain" having prevailed over more moderate counsels, Brissot, like most of his party, suffered death by the guillotine.

**BRISTLES**, the stiff, coarse, glossy hairs of the hog and the wild boar, especially of the hair growing on the back, extensively used by brushmakers, shoemakers, saddlers, etc., and chiefly imported from Russia and Germany. Russia supplies the finest qualities, which are worth about \$250 or \$300 per cwt.

**BRIS'TOL**, a cathedral city of England, a municipal, county, and parl. borough, situated partly in Gloucestershire, partly in Somersetshire, but forming a county in itself. It stands at the



confluence of the rivers Avon and Frome, which unite within the city, whence the combined stream (the Avon) pursues a course of nearly 7 miles to the Bristol Channel. The Avon is a navigable river, and the tides rise in it to a great height. The public buildings are numerous and handsome, and the number of places of worship very great. The most notable of these are the cathedral, founded in 1142, exhibiting various styles of architecture, and recently restored and enlarged; St. Mary Redcliff, said to have been founded in 1293, and perhaps the finest parish church in the kingdom. Among the educational institutions are the University College, the Theological Colleges of the Baptists and Independents, Clifton College, and the Philosophical Institute. There is a school of art, and also a public library. Bristol has glass-works, potteries, soap-works, tanneries, sugar-refineries, and chemical works, ship-building and machinery yards. Coal is worked extensively within the limits of the borough. The export and import trade is large and varied. There is a harbor in the city itself, and docks at Avonmouth and Portishead. Bristol is one of the most healthful of the large towns of the kingdom. It has an excellent water supply, chiefly obtained from the Mendip Hills. Pop. 328,842.

**BRISTOL-BOARD**, a fine kind of pasteboard, smooth, and sometimes glazed, on the surface.

**BRISTOL CHANNEL**, an arm of the Atlantic, extending between the southern shores of Wales and the southwestern peninsula of England, and forming the continuation of the estuary of the Severn. It is remarkable for its high tides.

**BRITAIN**, or **GREAT BRITAIN**, the island consisting of the three countries, England, Scotland, and Wales, the name being also used as equivalent to the British Islands collectively, or to the British Empire. Great Britain and Ireland, with their connected islands, form the United Kingdom of Great Britain and Ireland.

The British Islands form a kind of archipelago in the northwest of Europe. The principal islands are Great Britain and Ireland, separated from each other by the Irish Sea, which, near the center, attains its greatest width of about 130 miles; but between Holyhead in Wales and Howth Head in Ireland is not wider than 60 miles; while the distance between the Mull of Cantyre in Scotland and Fair Head in Ireland is only about 12 miles. Great Britain is the largest island in Europe, and the seventh largest in the world. Its nearest approach to the continent of Europe is at its s.e. extremity, where the Strait of Dover, separating it from France, is only 21 miles broad. The British Isles rise from a submarine plateau connecting them geologically with the rest of Europe, of which at a remote period they must have actually formed a part. This is evidenced too by the similarity of the British fauna and flora to the continental.

The n. part of Britain is, for the most part, rugged, mountainous, and barren, this being the character of much of

Scotland. The chief feature of the southern portion is the mountain mass of the Grampians, the culminating points of which, Bennevis and Benmacdhui, are the highest British summits, being respectively 4406 and 4296 feet. South of the Highlands lies the plain of the Forth and Clyde, a region of coal and iron, in which the chief manufacturing industries of Scotland are carried on.

The mountains which constitute the principal watersheds of Great Britain being generally at no great distance from the w. coast, the rivers which descend from them in that direction have generally a short course, and are comparatively unimportant. The two great exceptions to this rule are the Clyde and the Severn, which owe both their volume and the length of their course to a series of longitudinal valleys, which, instead of opening directly to the coast, take a somewhat parallel direction. The chief rivers entering the sea on the e. coast, proceeding from n. to s., are the Spey, Don, Dee, Tay, Forth, Tweed, Tyne, Ouse, Trent, and Thames, the last named in navigable importance the greatest river of the world. Owing to the great central flat of Ireland its rivers usually flow on in a gently winding course in different directions to the sea. Those of importance are not very numerous; but one of them, the Shannon, is the longest river of the British Isles, its length being about 225 miles; while the Thames is 215.

Their maritime situation has a favorable effect on the climate of the British Isles, making it milder and more equable than that of continental countries in the same latitude.

The principal cereal crops grown in England are wheat, barley, and oats, oats now covering the largest area; the principal green crops are turnips, potatoes, mangolds, vetches, etc. In Ireland and Scotland oats are by far the principal grain crop; by far the chief green crop being in Ireland potatoes, in Scotland turnips. Hops are grown to a large extent in Kent, and less extensively in some other parts of southern England.

Such is the mineral wealth of the British Isles that there is scarcely a metal or mineral product of economical value which is not worked, to a greater or less extent, beneath their surface. Among these the first place is due to coal, which, in regard both to the quantity raised annually and its aggregate value, surpasses any other mineral product. The coal-fields are not confined to one particular district, but extend as a series of basins in an irregular curve from central Scotland through northern and middle England to the Bristol Channel. On the east side of Scotland there are coal-fields both north and south of the Forth; farther west lie the coal-basins of Lanark, Renfrew, and Ayrshire; the first famous throughout the world for the immense manufacturing establishments which it mainly has called into existence and made prosperous. In the north of England is the great coal-field centering near Newcastle, which gives it its name.

Britain, next to the U. States, is the most important commercial country.

Its exports exceed \$1,800,000,000 and its imports \$2,900,000,000 annually. It has about 25,000 miles of railroad, of which upward of 20,000 belong to England and Wales. Its annual tonnage is about 110,000,000, and the number of its vessels about 20,000. Two-thirds of its tonnage is steam.

Every form of religion enjoys the most complete toleration, but there are two churches, one in England having an Episcopal form of government, and one in Scotland with a Presbyterian organization, established by law and partly supported by state endowments. Both of these are Protestant. In Ireland there has been no state church since 1871, when the branch of the Anglican Church there established was discontinued. The great majority of the people are Roman Catholics.

All education in England was long entirely voluntary. The average attendance is about 5,000,000. The elementary schools number 3000, the average attendance being about 650,000. Ireland is still far behind in the matter of education.

For the higher education there are in England the universities of Oxford, Cambridge, London, Durham, Birmingham, and Liverpool; Victoria University, Manchester; the University of Wales; also colleges, some of them called "University colleges," at Newcastle, Nottingham, Bristol, etc., besides institutions giving a university education in one or more departments; the training institutions for teachers; and the colleges belonging to the different religious bodies. London University, which till 1900 only held examinations and conferred degrees, is now a teaching institution, embracing University College, King's College, etc. In Scotland there are the universities of Edinburgh, Glasgow, Aberdeen, and St. Andrews, the last with a college at Dundee, St. Mungo's College, Glasgow—theological colleges, normal schools, etc. Ireland has the University of Dublin, the Queen's Colleges of Belfast, Cork, and Galway, in connection with the Royal University of Ireland, which is merely an examining and degree-conferring body; the Roman Catholic university, and Maynooth and other Roman Catholic colleges.

The earliest inhabitants of the United Kingdom known to history were Celts, who inhabited both Great Britain and Ireland at the time of the Roman occupation. In the 5th and 6th centuries, however, the Celts were displaced through the greater part of South Britain and in the eastern lowlands of North Britain by the Anglo-Saxons, a Teutonic race from which the modern English and Lowland Scotch are mainly descended. The Celts as a distinct people were gradually confined to the mountainous districts of Wales and Cornwall and the Highlands of Scotland, and only in Wales and Scotland has the Celtic language survived in Great Britain, being still also spoken by many in the west of Ireland. There is a considerable Celtic element, however, among the population everywhere. The English language is the direct descendant of that spoken by the Anglo-Saxons, but con-



tains a strong infusion of French elements introduced by the Normans in the 11th and following centuries, as well as other elements, chiefly of Latin and Greek origin, introduced in later times. The population is as follows: England 32,526,075; Wales, 4,471,957; Ireland, 4,456,546; islands, 150,000; total, 41,605,599.

The area of the British empire is about 11,435,283 sq. miles, with a population of about 393,000,000, distributed as follows: British Isles and possessions in Europe (Gibraltar, Malta, and Gozo), area, 121,000 sq. miles; pop. about 41,605,000; British India and feudatory states, Ceylon, Straits Settlements, Hong Kong, etc., in Asia; area, 1,900,000, pop. about 295,000,000; Cape Colony, Natal, Bechuanaland, Sierra Leone, Mauritius, St. Helena, protectorates and other African possessions, 2,500,000 sq. miles; pop. estimated 40,000,000; Canada, Newfoundland, Jamaica, Trinidad, and other West India islands; Honduras, Guiana, and all possessions in America, North or South, 3,648,000 sq. miles; pop. 6,790,000; Australia, Tasmania, New Zealand, Fiji, New Guinea, islands in the Pacific, etc.; area, 3,270,000 sq. miles; pop. about 4,285,000. The increase of some of the British colonies, especially of Canada and Australia, in population, wealth, and trade has been something prodigious within the last few years. Self-government has been conceded to the larger colonies.

Under the name of a constitutional and hereditary monarchy the government of Britain is vested in a sovereign and the two houses of parliament—the House of Lords and the House of Commons. Laws passed by these houses, and assented to by the sovereign, become the laws of the land. But under this general fixity of form the center of real power may change greatly, as it has in Great Britain within the last two centuries. The sovereign's right of veto on acts of parliament has practically passed into desuetude, while of the two legislative houses the House of Commons, from its being the expression of the national will as a whole, has become the real center of power and influence.

The British army has a total (peace footing) of 270,128 men, 42,140 horses, and 984 guns. It has a war footing of 1,315,000 men, 98,040 horses, and 1764 guns. The British navy consists of 40 first-class battle-ships, 20 second-class battle-ships, 7 coast defense ships, 24 armored cruisers, 147 other cruisers, 97 sea-going gunboats, 18 river gunboats, 149 torpedo boat destroyers, 188 torpedo boats, 383 transports and other service boats, 29 training ships, 6740 officers, and 124,930 men.

The island in the remotest times bore the name of Albion. From a very early period it was visited by Phœnicians, Carthaginians, and Greeks, for the purpose of obtaining tin. Cæsar's two expeditions, 55 and 54 B.C., made it known to the Romans, by whom it was generally called Britannia; but it was not till the time of Claudius, nearly a hundred years after, that the Romans made a serious attempt to convert Britain into a Roman province. Some forty years

later, under Agricola, the ablest of the Roman generals in Britain, they had extended the limits of the Provincia Romana as far as the line of the Forth and the Clyde. Here the Roman armies came into contact with the Caledonians of the interior, described by Tacitus as large-limbed, red-haired men. After defeating the Caledonians under Galgacus at "Mons Grampius" Agricola marched victoriously northward as far as the Moray Firth, establishing stations and camps, remains of which are still to be seen. But the Romans were unable to retain their conquests in the northern part of the island, and were finally forced to abandon their northern wall and forts between the Clyde and the Forth and retire behind their second wall, built in 120 A.D. by Hadrian, between the Solway and the Tyne. Thus the southern part of the island alone remained Roman, and became specially known as Britannia, while the northern portion was distinctively called Caledonia. The capital of Roman Britain was York (Eboracum). Under the rule of the Romans many flourishing towns arose. Great roads were made, traversing the whole country and helping very much to develop its industries. Christianity was also introduced, and took the place of the Druidism of the native British. Under the tuition of the Romans the useful arts and even many of the refinements of life found their way into the southern part of the island.

British history since the Norman conquest is really a history of the progress of the world since that time in the arts and the sciences. The principal events of its external political history are the war of the grand alliance in which the Duke of Marlborough commanded the British army and which ended in the peace of Utrecht in 1713; the loss of the American colonies, the consolidation of the Canadian colonies, the Napoleonic wars, the acquisition of India, Australia, and parts of Africa, and the gradual territorial growth of the empire, the extent of which is described above.

In 1900 the Unionist government appealed to the country on their South African War policy, and received a majority of over 130. Queen Victoria died on Jan. 22, 1901, and was succeeded by her eldest son Edward VII. In May, 1902, the South African War ended, and Lord Salisbury soon afterward resigned the premiership to Mr. A. J. Balfour. Edward VII. was crowned in Westminster Abbey on Aug. 9, 1902. In 1906 Sir Campbell-Bannerman became premier, and on his retirement in 1908, owing to ill health, the premiership was assumed by Herbert H. Asquith.

**BRITANNIA**, the ancient name of Britain.

**BRITANNIA METAL**, also called White Metal, a metallic compound or alloy of tin, with a little copper and antimony, used chiefly for tea-pots, spoons, etc. The general proportions are 85½ tin, 10½ antimony, 3 zinc, and 1 copper.

**BRITANNIA TUBULAR BRIDGE**, an iron tubular bridge across Menai Strait, which separates Anglesey from Wales, about one mile from the Menai Suspension Bridge. It has two principal spans

of 460 feet each over the water, and two smaller ones of 230 feet each over the land; constructed 1846–50. See Bridge.

**BRITANNICUS**, son of the Roman Emperor Claudius, by Messalina, born A.D. 42, poisoned A.D. 56. He was passed over by his father for the son of his new wife Agrippina. This son became the emperor Nero, whose fears that he might be displaced by the natural successor of the late emperor caused him to murder Britannicus.

**BRITISH CHANNEL**. See English Channel.

**BRITISH COLUMBIA**, a British colony forming with Vancouver Island a province of the Dominion of Canada. It is situated partly between the Rocky Mountains and the sea, partly between Alaska and the meridian of 120° w., and extends from the U. States boundary north to the 60th parallel n. lat. Area, 341,305 sq. miles (including Vancouver Island). Till 1858 it was part of the Hudson Bay Territory; in that year gold discoveries brought settlers, and it became a colony. Vancouver Island, 16,000 sq. miles, became a colony at the same time, but was afterward joined to British Columbia; the conjoined colony entered the Dominion in 1871. The coast-line is much indented, and is flanked by numerous islands, the Queen Charlotte Islands being the chief after Vancouver. The interior is mountainous, being traversed by the Cascade Mountains near the coast, and by the Rocky Mountains farther west. There are numerous lakes, generally long and narrow, and lying in the deep ravines that form a feature of the surface and are traversed by numerous rivers. Of these the Fraser, with its tributary the Thomson, belongs entirely to the colony, as does also the Skeena; while the upper courses of the Peace river and of the Columbia also belong to it. All except the Peace find their way to the Pacific. Its mountain ranges (highest summits: Mount Hooker, 15,700 feet, and Mount Brown, 16,000 feet) afford magnificent timber (including the Douglas pine and many other trees); and between the ranges are wide grassy prairies. Part of the interior is so dry in summer as to render irrigation necessary, and the arable land is comparatively limited in area, but there is a vast extent of splendid pasture land. The climate is mild in the lower valleys, but severe in the higher levels; it is very healthful. The chief products of the colony are gold, coal, silver, iron, copper, galena, mercury, and other metals; timber, furs, and fish, the last, particularly salmon, being very abundant in the streams and on the coasts. Gold exists almost everywhere, but has been obtained chiefly in the Cariboo district. The total yield since 1858 has been over \$75,000,000. The coal is found chiefly in Vancouver Island, and is mined at Nanaimo, where large quantities are now raised. Mining, cattle-rearing, agriculture, fruit-growing, salmon-canning, and lumbering are the chief industries. Victoria, on the s.e. coast of Vancouver Island, is the capital and chief town of the colony. Near Victoria is Esquimalt, a British naval station. New Westminster, on the Fraser river, about 15 miles from



its mouth, is a place of some importance; but the new town Vancouver, the terminus of the Canadian Pacific Railway, at the mouth of the Fraser, is the chief town on the mainland (pop. 17,000). Besides this railway there is one between Nanaimo and Victoria. Steamers now run to China and Japan in connection with the Canadian Pacific Railway, and lines to Australia and India are projected. Like the other provinces of the Dominion, British Columbia has a separate parliament and administration, with a lieutenant-governor of its own. (See Canada.) Schools are supported entirely by government. Pop. in 1881, 65,954, including about 25,000 Indians; in 1891, 98,173; in 1901, 177,272.

**BRITISH HONDURAS.** See Honduras, British.

**BRITISH MUSEUM**, the great national museum in London, owes its foundation to Sir Hans Sloane, who, in 1753, bequeathed his various collections, including 50,000 books and MSS., to the nation. Montague House was appropriated for the museum, which was first opened on the 15th January, 1759. The Museum is under the management of 48 trustees. It is open daily, free of charge. Admission to the reading-room as a regular reader is by ticket, procurable on application to the chief librarian, there being certain simple conditions attached. The library, which is now one of the largest and most valuable in the world, has been enriched by numerous bequests and gifts, among others the splendid library collected by George III. during his long reign. A copy of every book, pamphlet, newspaper, piece of music, etc., published anywhere in British territory, must be conveyed free of charge to the British Museum. The museum contains eight principal departments; namely, the department of printed books, maps, charts, plans, etc.; the department of manuscripts; the department of natural history; the department of oriental antiquities; the department of Greek and Roman antiquities; the department of coins and medals; the department of British and medieval antiquities and ethnography; and the department of prints and drawings.

**BRITISH NORTH AMERICA**, a name under which are included the Dominion of Canada and the colony of Newfoundland, comprising all the mainland north of the U. States (except Alaska) and a great many islands.

**BRIT'TANY**, or **BRETAGNE**, an ancient duchy and province of France, corresponding nearly to the modern departments of Finisterre, Côtes du Nord, Morbihan, Ille et Vilaine, Loire Inférieure. It is supposed to have received its name from the Britons who were expelled from England and took refuge here in the 5th century. Along the coast and toward its seaward extremity the country is remarkably rugged, but elsewhere there are many beautiful and fertile tracts. Fisheries employ many of the inhabitants. The people still retain their ancient language, which is closely allied to the Welsh, and is exclusively used by the peasantry in the western part of the province.

**BRI'ZA**, a genus of grasses, commonly called quaking grass, maiden's hair, or lady's tresses. There are about thirty species, chiefly found in South America.

**BROAD ARROW**, a government mark placed on British stores of every description (as well as on some other things) to distinguish them as public or crown property, and to obliterate or deface which is felony. Persons in possession of goods marked with the broad arrow forfeit the goods and are subject to a penalty. The origin of the mark is not clearly known.

**BROAD'CAST**, a mode of sowing grain by which the seed is cast or dispersed upon the ground with the hand or with a machine devised for sowing in this manner; opposed to planting in drills or rows.

**BROAD CHURCH**, a name given originally to a party in the Church of England, assuming to be midway between the Low Church or Evangelical section and the High Church or Ritualistic; now widely applied to the more tolerant and liberal section of any denomination.

**BROAD'SIDE**, in a naval engagement, the whole discharge of the artillery on one side of a ship of war. The term is also applied to any large page printed on one side of a sheet of paper, and, strictly, not divided into columns.

**BROAD'SWORD**, a sword with a broad blade, designed chiefly for cutting, formerly used by some regiments of cavalry and Highland infantry in the British service. The claymore or broadsword was the national weapon of the Highlanders.

**BROADWAY**, the leading thoroughfare of New York City. It begins at Bowling Green, near the southern point of Manhattan Island, and runs diagonally through the city to Central Park, and then by extension to the northern part of Manhattan. It contains many of the largest theaters, hotels, and retail shops, and is one of the busiest thoroughfares in the world.

**BROCADE'**, a stuff of silk, enriched with raised flowers, foliage, or other ornaments. The term is restricted to silks figured in the loom, distinguished from those which are embroidered after being woven. Brocade is in silk what damask is in linen or wool.

**BROD'HEAD**, John Romeyn, American historian, born in Philadelphia in 1814, died in 1873. His principal work is his *History of the State of New York*, published 1853-71.

**BROGUE** (brôg), a coarse and light kind of shoe made of raw or half-tanned leather, of one entire piece, and gathered round the foot by a thong, formerly worn in Ireland and the Highlands of Scotland. The term is also used of the mode of pronunciation peculiar to the Irish.

**BROKE**, Sir Philip Bowes Vere, a British admiral, born in 1776, died in 1841; distinguished himself, particularly in 1813, as commander of the *Shannon*, in the memorable action which that vessel, in answer to a regular challenge, fought with the U. States vessel *Chesapeake* off the American coast, and in which the latter was captured.

**BROKEN-WIND**, a disease in horses, often accompanied with an enlargement of the lungs and heart, which disables them for bearing fatigue. In this disease the expiration of the air from the lungs occupies double the time that the inspiration of it does; it requires also two efforts rapidly succeeding to each other, attended by a slight spasmodic action, in order fully to accomplish it. It is caused by rupture of the air-cells, and there is no known cure for it.

**BROKER**, an agent who is employed to conclude bargains or transact business for others in consideration of a charge or compensation, which is usually in proportion to the extent or value of the transaction completed by him, and is called brokerage. In large mercantile communities the business of each broker is usually limited to a particular class of transactions, and thus there are brokers with several distinctive names, as bill-brokers, who buy and sell bills of exchange for others; insurance-brokers, who negotiate between underwriters and the owners of vessels and shippers of goods; ship-brokers, who are the agents of owners of vessels in chartering them to merchants or procuring freights for them from one part to another; stock-brokers, the agents of dealers in shares of joint-stock companies, government securities, and other monetary investments.

**BROM'BERG**, a town of Prussia, province of Posen, on the Brahe, near its confluence with the Vistula. Among its industries are machinery, iron-founding, tanning, paper, tobacco, chicory, pottery, distilling, and brewing. The Bromberg Canal connects the Brahe with the Netz, and thus establishes communication between the Vistula, the Oder, and the Elbe. Pop. 52,154.

**BROMELIA'CEÆ**, the pineapple family, a natural order of endogenous plants, taking its name from the genus *Bromelia* (so called after a Swedish botanist, Olaus Bromel), to which the pineapple was once incorrectly referred, and consisting of herbaceous plants remarkable for the hardness and dryness of their gray foliage. They abound in tropical America, commonly growing epiphytically on the branches of trees. With the exception of the pineapple the *Bromeliaceæ* are of little value, but some species are cultivated in hot-houses for the beauty of their flowers. They can exist in dry hot air without contact with the earth, and in hot-houses are often kept hung in moist moss.

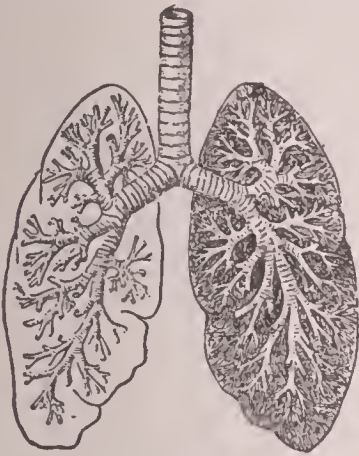
**BROMIDES**, certain salts consisting of hydrobromic acid united with another substance such as a metal, or metallic salts. Bromides, especially the bromide of potassium, are used extensively in medicine.

**BRO'MINE**, a non-metallic element discovered in 1826. In its general chemical properties it much resembles chlorine and iodine, and is generally associated with them. It exists, but in very minute quantities, in sea-water, in the ashes of marine plants, in animals, and in some salt springs. It is usually extracted from bittern by the agency of chlorine. At common temperatures it is a very dark reddish liquid of a powerful and suffocating odor, and



emitting red vapor. It has bleaching powers like chlorine, and is very poisonous. Its density is about four and a half times that of water. It combines with hydrogen to form hydrobromic acid gas. With oxygen and hydrogen it forms bromic acid.—Bromide of potassium has sedative and other properties, and is used in medicine (scrofula, goiter, rheumatism, etc.); bromide of silver is used in photography.

**BRON'CHI** (-ki), the two branches into which the trachea or wind-pipe divides in the chest, one going to the



Bronchi and their ramifications.

right lung, the other to the left, and ramifying into innumerable smaller tubes—the bronchial tubes.

**BRONCHITIS** (bron-ki'tis), an inflammation of the mucous membrane of the bronchial tubes, or the air-passages leading from the trachea to the lungs. (See Bronchi.) It is of common occurrence, and may be either acute or chronic. Its symptoms are those of a feverish cold, such as headache, lassitude, and an occasional cough, which are succeeded by a more frequent cough occurring in paroxysms, a spit of yellowish mucus, and a feeling of great oppression on the chest. Slight attacks of acute bronchitis are frequent and not very dangerous. They may be treated with mustard poultices or fomentations. Acute bronchitis is often a formidable malady, and requires prompt treatment. Confirmed chronic bronchitis is hardly amenable to medical treatment. Its main symptoms are cough, shortness of breath, and spit. It is particularly apt to attack a person in winter; and in the end may cause death through the lungs becoming unable to do their work, and through accompanying complications.

**BRON'TE**, Charlotte (afterward Mrs. Nicholls), English novelist, born at Thornton, in Yorkshire, 21st April, 1816; died at Haworth, 31st March, 1855. The success of *Jane Eyre*, which was published in October, 1847, was immediate and decided. Her second novel, *Shirley*, appeared in 1849. In the autumn of 1852 her third novel, *Villette*, was published. Shortly after, she married her father's curate, the Rev. Arthur Bell Nicholls, but in nine months died of consumption. Her originally rejected tale of *The Professor* was published after her death, in 1857, and the same year a biography of her appeared from the pen of Mrs. Gaskell.

**BRONTOSAURUS**, a gigantic reptilian animal, of the order Dinosauria, found fossil in secondary strata of the Rocky Mountains, having a long neck and tail, a very small head, and strong limbs. It seems to have lived in swampy localities, and to have been herbivorous. Living it must have weighed between 20 and 30 tons.

**BRONZE** is an alloy of copper and tin, to which other metallic substances are sometimes added, especially zinc. It is a fine-grained metal, taking a smooth and polished surface, harder and more fusible than copper, but not so malleable. In various parts of the world weapons and implements were made of this alloy before iron came into use, and hence the bronze age is regarded as one coming between the stone age and the iron age of prehistoric archæology. (See Archæology.) Both in ancient and modern times it has been much used in making casts of all kinds, metals, bas-reliefs, statues, and other works of art; and varieties of it are also used for bells, gongs, reflectors of telescopes, cannon, etc. Its color is reddish, brownish, or olive-green, and is darkened by exposure to the atmosphere. Ancient bronze generally contains from 4 to 15 per cent of tin. An alloy of about 85 parts copper, 11 zinc, and 4 tin is used for statues. Bell-metal consists of 78 of copper and 22 of tin. An alloy called phosphor bronze, consisting of about 90 per cent of copper, 9 of tin, and from 5 to 75 of phosphorus has been found to have peculiar advantages for certain purposes. The addition of phosphorus increases the homogeneousness of the compound, and by varying the proportion of the constituents the hardness, tenacity, and elasticity of the alloy may be modified at pleasure.—Aluminium bronze is an alloy of copper and aluminium, the metals being combined in different proportions according to the kind of bronze wanted. One variety is of a yellow or golden color, and is made into watch-chains and ornamental articles.—Manganese bronze is a bronze containing manganese and iron, and is said to possess remarkable properties in regard to strength, hardness, toughness, etc.—Bronzing is the operation of covering articles with a wash or coating to give them the appearance of bronze. Two kinds are common, the yellow and the red. The yellow is made of fine copper dust, the red of copper dust with a little pulverized red ochre. The fine green tint which bronze acquires by oxidization, called patina antiqua, is imitated by an application of sal-ammoniac and salt of sorrel dissolved in vinegar. Recently bronze has been deposited on small statues and other articles with good effect by means of the electrolytic process.

**BRONZING**. See Bronze.

**BROOCH** (brōch), a kind of ornament worn on the dress, to which it is attached by a pin stuck through the fabric. They are usually of gold or silver, often worked in highly artistic patterns and set with precious stones. Brooches are of great antiquity, and were formerly worn by men as well as women, especially among the Celtic races.

**BROOK FARM**, a community at West Roxbury, Mass., founded by George

Ripley to test the socialistic doctrines of Fourier. Among the members were George W. Curtis, Nathaniel Hawthorne, Charles H. Dana, and Margaret Fuller. Hawthorne based his story "The Blithedale Romance" on Brook Farm. The community fell to pieces after a short life.

**BROOKLYN**, a borough of New York City, formerly a city in Long Island on Long Island Sound. Population, 1906, 1,500,000. It consists of an aggregation of villages which have gradually grown together to form a vast city, and that is why the streets have no uniformity of plan. The park system of Brooklyn consists of 36 parks, with a combined area of 1566½ acres, and 22 parkways, 42½ miles in length. The principal park is Prospect; area, 516½ acres. It is on the highest ground in the city, and includes 110 acres of woodland. Fort Greene Park, 30 acres of beautiful grounds, is less than half a mile from the Borough Hall. Here 11,000 victims of the Revolutionary War prison ships are entombed. The Soldiers and Sailors' Memorial Arch on Prospect Park Plaza, dedicated in 1892, is of white marble; the bas-reliefs are by Maurice J. Power. Six cemeteries lie wholly or partly in Brooklyn, and others are just beyond the borough boundary in Queens. Greenwood, southwest of Prospect Park, has an area of 474 acres, and is widely known for the beauty of its ground and monuments. Other cemeteries within Brooklyn's boundaries are Evergreens, Holy Cross, Kings County Farm (Potter's Field), Maimonides Cemetery, 7½ acres; Mount Hope, 12 acres; Washington Cemetery, on Ocean Parkway. The suspension-bridge over the East river was commenced Jan. 2, 1870. The first wire was run out May 29, 1877, and the bridge was opened to the public May 24, 1883. The bridge railroad was opened Sept. 24, 1883. Total length, with extensions, 6537 feet. The original cost of construction was \$15,000,000.

Brooklyn is called "the city of churches." There are 400 Protestant churches, with a total indebtedness of \$1,863,700, and property valued at \$169,923,681. There are 84 Roman Catholic churches, with property to the value of \$10,086,000, indebted to the extent of \$1,342,859. There are 75 religious societies and Young Men's Christian Associations, besides church societies, 100 city missionaries, 31 missions, 10 Chinese missions, 41 church sewing and industrial schools, 19 church kindergartens, and 19 free church reading-rooms. There are 6 high-schools, a training-school for teachers, 122 day and 16 evening schools, 10 industrial and asylum schools, and a truant school. There are 23 libraries, having an aggregate of more than 480,000 volumes, of which 208,445 volumes are also in free circulation. Brooklyn has developed an extensive commerce. The wharves and docks of the city have a water frontage of more than 25 miles, lined with great storehouses and elevators, and represent an investment of hundreds of millions of dollars. Ninety per cent of the coffee and sugar imported into the U. States is received there. Thirty-three regular lines of steamships,



and a great number of "tramp" steamers and sailing vessels, dock in Brooklyn. Along the water-front are also extensive basins, one covering 40 acres and accommodating 500 vessels at one time, ship-yards, dry-docks, and marine railways. Here also is the Brooklyn Navy-yard, the most important station in the U. States, where four-fifths of the stores for the entire navy are handled, and war-ships repaired and fitted for sea. Pop. 1909, 1,492,970. See New York.

**BROOKS**, Phillips, a noted American Protestant Episcopal bishop and preacher, born in Boston Dec. 13, 1835, died in 1893. He served in charges at Philadelphia and Boston, and was elected bishop of Massachusetts in 1891. His works are: *Lectures on Preaching*, *The Influence of Jesus*, and several volumes of sermons. His hymn, *O, Little Town of Bethlehem*, is one of the most popular Christmas hymns of the church.

**BROOKS**, Preston Smith, an American lawyer and legislator, born in South Carolina in 1819, died in 1857. He served as congressman from 1852 to 1856. On May 22, 1856, he assaulted Senator Charles Sumner while the latter was at his desk in the senate chamber, the alleged offense being Sumner's arraignment of South Carolina in his famous speech on the "Crime of Kansas," delivered a few days previously.

**BROOM**, a popular name which includes several allied genera of plants distinguished by a leguminous fruit and papilionaceous flowers. The common broom of Europe is a bushy shrub with straight angular branches, of a dark-green color, deciduous leaves, and flowers of a deep golden yellow. Its twigs are often made into brooms, and are used as thatch for houses and corn-stacks. They have also been used for tanning. The whole plant has a very bitter taste, and a decoction of it is diuretic, in strong doses emetic.—White broom or Portugal broom has beautiful white flowers.—Spanish broom or Spart is an ornamental flowering shrub growing in Africa, Spain, Italy, and the s. of France. It has upright, round branches, that flower at the top, and spear-shaped leaves. Its fiber is made into various textile fabrics, and is also used in paper-making.—Dyer's broom yields a yellow color used in dyeing.—Butcher's broom is an evergreen shrub of the order Liliaceæ, and therefore entirely different from the brooms proper.

**BROOM-CORN**, **BROOM-GRASS**, a plant of the order of grasses, with a jointed stem, rising to the height of 8 or 10 feet, extensively cultivated in N. America, where the branched panicles are made into carpet-brooms and clothes-brushes. The seed is used for feeding poultry, cattle, etc.

**BROTH**, the liquor in which some kind of flesh is boiled and macerated, often with certain vegetables, to give it a better relish. Beef-tea is a kind of broth. Scotch broth is a kind of soup in which pot-barley is an ingredient.

**BROTHERHOODS**. See Fraternities.

**BROTHERS**, a term applied to the members of monastic and military orders as being united in one family. Lay brothers were an inferior class of

monks employed in monasteries as servants. Though not in holy orders, they were bound by monastic rules.

**BROUGH**, John, an American governor and politician, born in Ohio in 1811, died in 1865. He is known as "the war governor of Ohio."

**BROUGHAM** (bröm or brō'ēm), a close four-wheeled carriage, with a single inside seat for two persons, glazed in front and with a raised driver's seat, named after and apparently invented by Lord Brougham.

**BROUGHAM** (bröm or brō'ēm), Henry, Baron Brougham and Vaux, was born at Edinburgh 19th September, 1778; died at Cannes 7th May, 1868. He was educated at Edinburgh, studied law there, and was admitted a member of the Society of Advocates in 1800. Along with Jeffrey, Horner, and Sydney Smith, he bore a chief part in the start-



Lord Brougham.

ing of the Edinburgh Review in 1802, to which he contributed a great number of articles. Finding too circumscribed a field for his abilities in Edinburgh he removed to London, and in 1808 was called to the English bar. In 1810 he entered parliament as member for the borough of Camelford, joined the Whig party, which was in opposition, and soon after obtained the passing of a measure making the slave-trade felony. At the general election of 1830 he was returned for the large and important county of York. In the ministry of Earl Grey he accepted the post of lord-chancellor, and was raised to the peerage (22d Nov. 1830), with the title of Baron Brougham and Vaux. In this post he distinguished himself as a law reformer, and aided greatly in the passing of the Reform Bill of 1832. Lord Brougham accomplished a large amount of literary work, contributing to newspapers, reviews, and encyclopedias, besides writing several independent works; and he had no mean reputation in mathematics and physical science.

**BROUGHTON** (brā'tun), John Cam Hobhouse, Lord, English writer and statesman; born 1786, died 1869. He entered parliament in 1819 as member for Westminster. In 1832 he entered Lord Melbourne's ministry as secretary at war, and became a privy-councilor. In 1833 he was made chief-secretary for Ireland, and in 1835 he was appointed president of the board of control. He

held this office till Sept., 1841, and in Lord Russell's administration, 1846-52. He was raised to the peerage as Baron Broughton in 1851.

**BROUSSONET** (brö-so-nā), Pierre Marie Auguste, French naturalist, born 1761, died 1807. He was professor of botany at Montpellier, and a member of the Academy of Sciences.

**BROWN**, a color which may be regarded as a mixture of red and black, or of red, black, and yellow. There are various brown pigments, mostly of mineral origin, as bister, umber, cappagh brown, etc.

**BROWN**, Charles Brockden, an eminent American novelist, was born in Philadelphia in 1771, died 1810. He was originator of the *Monthly Magazine* and *American Review* (1799-1800). He also founded in 1805 the *Literary Magazine* and *American Register*, which he edited for five years.

**BROWN**, John, an American opponent of slavery, born 1800, hanged 1859. He early conceived a hatred for slavery, and having removed to Osawatomie, Kansas, in 1855, he took an active part against the pro-slavery party, the slavery question there giving rise already almost to a civil war. In the summer of 1859 he rented a farmhouse about 6 miles from Harper's Ferry, and organized a plot to liberate the slaves of Virginia. On Oct. 16 he, with the aid of about twenty friends, surprised and captured the arsenal at Harper's Ferry, but was wounded and taken prisoner by the Virginia militia next day, tried, and executed at Charlestown, 2d Dec.

**BROWN**, Robert, botanist, born at Montrose, December 21, 1773; died in London June 10, 1858. In 1800 he was appointed naturalist to Flinders's surveying expedition to Australia. He returned with nearly 4000 species of plants, and was shortly after appointed librarian to the Linnæan Society. He was the first English writer on botany who adopted the natural system of classification, which has since entirely superseded that of Linnæus. In 1810 he received the charge of the collections and library of Sir Joseph Banks. He transferred them in 1827 to the British Museum, and was appointed keeper of botany in that institution. He became a fellow of the Royal Society in 1811, D.C.L. Oxford in 1832, and a foreign associate of the French Academy of Sciences in 1833. He had the Copley medal in 1839, and was appointed president of the Linnæan Society in 1849. As a naturalist Brown occupied the very highest rank among men of science.

**BROWN**, Dr. Thomas, Scotch metaphysician, was born at Kirkmabreck, Kirkcudbright, in 1778; died at Brompton, London, 1820. He distinguished himself, at a very early age, by an acute review of the medical and physiological theories of Dr. Darwin, in a work entitled *Observations on Darwin's Zoonomia*. He published some indifferent poems which were collected in 1820. But he chiefly deserves notice on account of his metaphysical speculations, his chief work being *Lectures on the Philosophy of the Human Mind*, 1822. His system reduces the intellectual faculties to three great classes—perception, sim-



ple suggestion, and relative suggestion; employing the term suggestion as nearly synonymous with association. He held original views in regard to the part played by touch and the muscular sense in relation to belief in an external world. His development of the theory of cause and effect was first suggested by Hume.

**BROWN UNIVERSITY**, founded at Providence, R. I., in 1765, and named for Nicholas Brown, one of its supporters. The university confers degrees in art, science, and philosophy. It has an endowment of nearly \$2,000,000, 100 instructors and a student body of nearly 1000. The libraries contain 120,000 volumes. The school is open, in all departments, to women.

**BROWNE**, Charles Farrar, an American humorist, best known as "Artemus Ward," was born at Waterford, Maine, 1836; died at Southampton, England, 1867. Originally a printer, he became editor of papers in Ohio, where his humorous letters became very popular. He subsequently lectured on California and Utah in the States and in England, where he contributed to *Punch*. His writings consist of letters and papers by "Artemus Ward," a pretended exhibitor of wax figures and wild beasts, and are full of drollery and eccentricity.

**BROWNE**, Francis Fisher, an American poet and critic, born in South Halifax, Vt., 1843. He has edited several literary publications, including *The Dial*, of which he has been the editor since 1880. He has published several collections of poems.

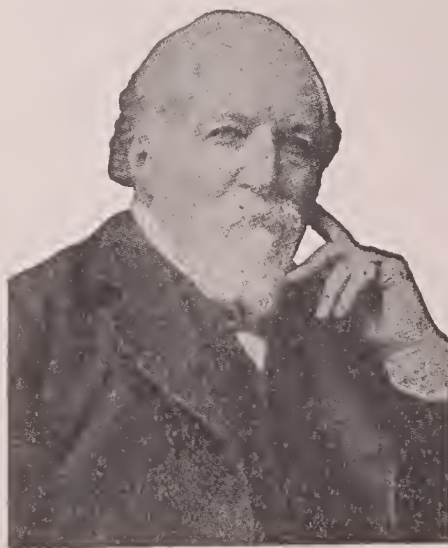
**BROWNE**, Hablot Knight, an English designer of humorous and satirical subjects, and an etcher of considerable skill, better known by the pseudonym of "Phiz," born at Kennington, Surrey, 1815, died at Brighton 1882. In 1835 he succeeded Seymour as the illustrator of Dickens's *Pickwick*, and was afterward engaged to illustrate *Nicholas Nickleby*, *Dombey & Son*, *Martin Chuzzlewit*, *David Copperfield*, and other works of that author. He also illustrated the novels of Lever, Ainsworth, etc., besides sending many comic sketches to the illustrated serials of the time.

**BROWNIE**, in Scotland, an imaginary spirit formerly believed to haunt houses, particularly farmhouses. Instead of doing any injury he was believed to be very useful to the family, particularly to the servants if they treated him well, for whom he was wont to do many pieces of drudgery while they slept. The brownie bears a close resemblance to the Robin Goodfellow of England, and the Kobold of Germany.

**BROWNING**, Elizabeth Barrett, English poetess; born at Burn Hall, Durham, in 1809; died at Florence 1861. Her bodily frame was from the first extremely delicate, but her mind was sound and vigorous, and disciplined by a course of severe and exalted study. She early began to commit her thoughts to writing, and in 1826 a volume, entitled *An Essay on Mind*, with other Poems, appeared of her authorship. Her health was at length partially restored, and in 1846 she was married to Mr. Robert Browning, soon after which they

settled in Italy, and continued to reside for the most part in the city of Florence. Her *Prometheus Bound* (from the Greek of Æschylus) and *Miscellaneous Poems* appeared in 1833; the *Seraphim* and other Poems in 1838. In 1856 a collected edition of Mrs. Browning's works appeared, including several new poems, and among others *Lady Geraldine's Courtship*. *Casa Guidi Windows*, a poem on the struggles of the Italians for liberty in 1848-49, appeared in 1851. The longest and most finished of all her works, *Aurora Leigh*, a narrative and didactic poem in nine books, was published in 1857. Poems before Congress appeared in 1860, and two posthumous volumes, *Last Poems*, 1862, and *The Greek Christian Poets and the English Poets* (prose essays and translations), 1863 were edited by her husband.

**BROWNING**, Robert, poet, born at Camberwell May 7, 1812; died Dec. 12, 1889. In 1846 he married Elizabeth Barrett (see above), and thereafter resided chiefly in Italy, making occasional



*Robert Browning*

visits to England. His first poem, *Pauline*, was published in 1833; followed by *Paracelsus* in 1835; *Strafford*, a Tragedy (1837), produced at Covent Garden. *Sordello* appeared in 1840, followed by *Pippa Passes*, *A Blot on the Scutcheon*, *Luria*, *A Soul's Tragedy*, the well-known *Pied Piper of Hamelin*, and *How They Brought the Good News from Ghent to Aix* (1841-46). Between 1846 and 1889 appeared *The Ring and the Book*, his longest poem, *Fifine at the Fair*; *Aristophanes' Apology*; *Dramatic Idylls*; *Jocoseria*; *Ferishtah's Fancies*; *Asolando*. He received the degree of D.C.L. from Oxford in 1882. A Browning Society for the study of his works was formed in 1881, under whose auspices several of his dramas have been performed. His poems are often difficult to understand from the quick transitions of thought, and they are not infrequently rugged and harsh in expression, yet they are among the chief poetic utterances of last century.

**BRUCE**, a family name distinguished in the history of Scotland. The family of Bruce (or de Brus) was of Norman

descent, its founder having obtained from William the Conqueror large grants of land in Northumberland. After being frequently involved in border warfare with the Scots, the house of Bruce received about 1130 from David I. a grant of the lands of Annandale, thus obtaining a footing in the south of Scotland.

**BRUCE**, David. See David II.

**BRUCE**, Edward, a brother of Robert I., who, after distinguishing himself in the war of independence, crossed in 1315 to Ireland to aid the native septs against the English. After many successes he was crowned king of Ireland at Carrickfergus, but fell in battle near Dundalk in 1318.

**BRUCE**, Robert, the greatest of the kings of Scotland, born 1274. In 1296, as Earl of Carrick, he swore fealty to Edward I., and in 1297 fought on the English side against Wallace. He then joined the Scottish army, but in the same year returned to his allegiance to Edward until 1298, when he again joined the national party, and became in 1299 one of the four regents of the kingdom. In the three final campaigns, however, he resumed fidelity to Edward, and resided for some time at his court; but, learning that the king meditated putting him to death on information given by the traitor Comyn, he fled in Feb., 1306, to Scotland, stabbed Comyn in a quarrel at Dumfries, assembled his vassals at Lochmaben Castle, and claimed the crown, which he received at Scone, March 27th. Being twice defeated, he dismissed his troops, retired to Rathlin Island, and was supposed to be dead, when, in the spring of 1307, he landed on the Carrick coast, defeated the Earl of Pembroke at Loudon Hill, and in two years had wrested nearly the whole country from the English. He then in successive years advanced into England, laying waste the country; and on June 24, 1314, defeated at Bannockburn the English forces advancing under Edward II. to the relief of the garrison at Stirling. In 1316 he went to Ireland to the aid of his brother Edward, and on his return in 1318, in retaliation for inroads made during his absence, he took Berwick and harried Northumberland and Yorkshire. Hostilities continued until the defeat of Edward near Byland Abbey in 1323, and though in that year a truce was concluded for thirteen years, it was speedily broken. Not until March 4, 1328, was the treaty concluded by which the independence of Scotland was fully recognized. Bruce did not long survive the completion of his work, dying at Cardross Castle on June 7, 1329. He was twice married; first to a daughter of the Earl of Mar, Isabella, by whom he had a daughter, Marjory, mother of Robert II.; and then to a daughter of Aymer de Burgh, Earl of Ulster, Elizabeth, by whom he had a son, David, who succeeded him.

**BRUCINE**, an alkaloid accompanying strychnia in *nux vomica*. Its taste is exceedingly bitter and acrid, and its action on the animal economy is entirely analogous to that of strychnia, but much less powerful.



**BRUGES** (brüz), an old walled city of Belgium, capital of West Flanders, 57 miles n.w. Brussels, on the railway to Ostend. It is an important canal center, and has over fifty bridges, all opening in the middle for the passage of vessels. The principal canals are those to Sluis, Ghent, and Ostend, on all of which pretty large vessels can come up to Bruges. Among its more noteworthy buildings are the Halles (containing cloth and other halls or markets), a fine old building, with a tower 354 feet high, in which is a numerous set of chimes; the Hôtel de Ville, the Bourse, and the Palace of Justice; the Church of Notre Dame, with its elevated spire and splendid tombs of Charles the Bold and Mary of Burgundy; etc. The town possesses interesting works of art by Jan Van Eyck, Memling, the Van Oosts, etc. Textile goods, lace, etc., are manufactured. Pop. 51,657.

**BRUHL** (brül), Heinrich, Count von, minister and favorite of Augustus III., king of Poland, born in 1700, died 1763. In 1747 he became the prime-minister of Augustus, to gratify whose wishes he exhausted the state, plunged the country into debt, and greatly reduced the army. He acquired great wealth and lived in greater state than the king himself. His profusion was often beneficial to the arts and sciences, and his library of 62,000 vols. forms a chief part of the Royal Library at Dresden.

**BRUISE**, a hurt caused by a blow or other violent pressure on the body. Owing to the rupture of small blood-vessels and the leakage of blood into the tissues the skin becomes discolored in the region affected. The best remedy for bruises is rest. The pain resulting from small bruises may be relieved by letting cold water fall on the part, or by immersing the part in cold water.

**BRUMAIRE** (brü-mâr), the second month in the calendar adopted by the first French republic, beginning on the 23d of October and ending 21st November. The 18th Brumaire of the year VIII. of the French Revolution (Nov. 9, 1799) witnessed the overthrow of the Directory by Bonaparte. The next day he dispersed at the point of the bayonet the Council of Five Hundred, and was elected consul.

**BRUMMELL**, George Bryan (Beau Brummell), son of a clerk in the Treasury, born in London in 1778, died 1840. He was educated at Eton and at Oxford, and at the age of sixteen made the acquaintance of the Prince of Wales, afterward George IV., who made him a cornet in his own regiment of the 10th Hussars, and secured his rapid promotion. The death of his father in 1794 brought him a fortune of \$150,000, which he expended in a course of sumptuous living, extending over twenty-one years, during which his dicta on matters of etiquette and dress were received in the beau monde as indisputable.

**BRUNEL**, Isambard Kingdom, English engineer, son of Sir Mark Isambard Brunel, born in 1806, died in 1859. He was educated at the Henri IV. College, Paris; and commenced practical engineering under his father, acting at twenty as resident engineer at the Thames Tunnel. Among his best-known

works were the Great Western, Great Britain, and Great Eastern steamships; the entire works on the Great Western Railway, to which he was appointed engineer in 1833; the Hungerford Suspension-bridge; docks at Plymouth, Milford Haven, etc.

**BRUNEL**, Sir Mark Isambard, a distinguished engineer, born near Rouen in 1769. He was educated in Rouen, his mechanical genius early displaying itself. Among his inventions were a machine for making seamless shoes, machines for making nails and wooden boxes, for ruling paper and twisting cotton into hanks, and a machine for producing locomotion by means of carbonic acid gas; but his greatest engineering triumph was the Thames Tunnel, commenced March, 1825, and opened in 1843. In 1841 the honor of knighthood was conferred on him. He died in Dec., 1849.

**BRUNN** (brün), an Austrian city, capital of Moravia, on the railway from Vienna to Prague, nearly encircled by the rivers Schwarzwawa and Zwitterwawa. It contains a cathedral and other handsome churches; a landhaus, where the provincial assembly meets, and several palaces; and has extensive manufactures of woollens, which have procured for it the name of the Austrian Leeds. Pop. 108,944.

**BRUNO**, Giordano (jor-dä'nō), an Italian philosopher of the Renaissance, born at Nola about 1550. He entered the order of Dominicans, but was accused of impiety, and, after enduring much persecution, fled from Rome about 1577 to Geneva. Here he was soon persecuted in turn by the Calvinists, and traveled slowly through southern France to Paris, where he was offered a chair of philosophy, but declined to fulfil its conditions of attendance at mass. In 1583 he went to London, where he published several of his works, and to Oxford, where he taught for a short time. In 1585 he went by way of Paris and Marburg to Wittenberg, and from 1586 to 1588 taught his philosophy there. He next went to Prague and to Helmstedt, where he remained till 1589; thence to Frankfort until 1592; and finally to Padua, where he remained until the inquisition of Venice arrested him and transferred him to Rome. After an imprisonment of seven years, during which he steadfastly refused to retract his doctrines, he was burned, February 16, 1600, for apostasy, heresy, and violation of his monastic vows. His doctrines form a more complete Pantheistical system than had been previously exhibited, and represent the highest level of the thought of the period.

**BRUNO, THE GREAT**, Archbishop of Cologne and Duke of Lorraine, third son of Henry the Fowler, and brother of the Emperor Otho I. He was employed in various important negotiations, and was a great patron of learning. Commentaries on the Pentateuch, and some biographies of saints, are ascribed to him. He died 965, at Rheims.

**BRUNSWICK**, a duchy and sovereign state in the northwest of Germany, area

1425 sq. miles. A good portion of it is hilly or undulating, and it partly belongs to the Harz mountain system. Mining is carried on chiefly in the Harz, and the minerals include iron, lead, copper, brown coal, etc. About half the surface is arable, and the chief cultivated products are grain, flax, hops, tobacco, potatoes, and fruit. Brewing, distilling, the manufacture of linens, woollens, and leather, the preparation of paper, soap, tobacco, beet-sugar, with agriculture and mining, afford the principal employment of the people. Pop. 464,251, mostly Lutherans by religion.—Brunswick, the capital, is situated on the Oker, and on the railway from Hanover to Berlin. The principal buildings of note are the ducal palace, the cathedral of St. Blaise (1173), St. Catherine's Church (dating from 1172), and St. Magnus's (1031), the Gewandhaus, and the fine old Gothic Council House. The educational institutions include the polytechnic school, a gymnasium, etc., and there are a city museum, a ducal museum, and a public library. The principal manufactures are wool, linen, jute, machinery, sewing-machines, gloves, lackered wares, etc., chemicals, and the town is famous for beer. Pop. 128,177.

**BRUNSWICK** (brunz'wik), a city, port of entry, and county seat of Glynn Co., Ga., 90 miles south by west of Savannah, on Saint Simon's Sound, 8 miles from the ocean, and on the Seaboard Air Line, the Plant System, and the Southern railroads. Pop. 10,840.

**BRUNSWICK**, a town of Maine, on the Androscoggin, 26 miles n.e. of Portland. At Bowdoin College, in this town, Hawthorne and Longfellow graduated in 1825, and the latter filled the chair of modern languages for several years. Pop. 10,125.

**BRUNSWICK**, Family of, a distinguished family founded by Albert Azo II., Marquis of Reggio and Modena, a descendant, by the female line, of Charlemagne. In 1047 he married Cunigunda, heiress of the Counts of Altorf, thus uniting the two houses of Este and Guelph. From his son, Guelph, who was created Duke of Bavaria in 1071, and married Judith of Flanders, a descendant of Alfred of England, descended Henry the Proud, who succeeded in 1125, and by marriage acquired Brunswick and Saxony. Otho, the great-grandson of Henry by a younger branch of his family, was the first who bore the title of Duke of Brunswick (1235). By the two sons of Ernest of Zell, who became duke in 1532, the family was divided into the two branches of Brunswick-Wolfenbüttel (II.) and Brunswick-Hanover, from the latter of which comes the present royal family of Britain. The former was the German family in possession of the duchy of Brunswick until the death of the last duke in 1884. George Louis, son of Ernest Augustus and Sophia, granddaughter of James I. of England, succeeded his father as Elector of Hanover in 1698, and was called to the throne of Great Britain in 1714 as George I.

**BRUNSWICK, NEW**. See New Brunswick.



**BRUNSWICK BLACK**, a varnish composed chiefly of lamp-black and turpentine, and applied to cast-iron goods. Asphalt and oil of turpentine also are ingredients in some kinds of it.

**BRUNSWICK GREEN**, commonly a carbonate of copper mixed with chalk or lime.

**BRUSA, BROUSSA** (brö'sä), or **BURSA**, a Turkish city in Asia Minor, south of the Sea of Marmora, about 20 miles distant from its port Mudania, with a pop. of about 75,000 Turks, Greeks, Armenians, and Jews, engaged in commerce, and the manufacture of satins, silk stuffs, carpets, gauze, etc.

**BRUSH**, Charles Francis, an American inventor, born in Ohio in 1849. His principal inventions are the dynamo which bears his name and a number of other electric devices, being chiefly improvements on his dynamo. He is the founder of the Brush Electric Company.

**BRUSH**, an implement for removing dirt, for polishing surfaces, or for painting. Brushes are made of broom (which see), bristles, wire, and of various kinds of hair. Among the materials principally used in the manufacture of brushes are bristles, broom straw, feathers, and the hair of the camel, squirrel, goat, badger, and bear. Brushes are simple when they consist of a single tuft, compound when they consist of a series of tufts. The brush industry of the U. States has increased vastly during the past twenty years.

**BRUSH-WHEEL**, a toothless wheel sometimes used in light machinery to turn a similar wheel by means of bristles, or some brush-like or soft substance, as cloth, buff-leather, india-rubber, or the like.

**BRUSSELS**, the capital of Belgium and of the province of Brabant, is situ-

part is surrounded with fine boulevards on the site of its fortifications, and in many places presents a congeries of twisted streets. The upper town, which is partly inside the boulevards and partly outside, is the finest part of the city, and contains the king's palace, the palace of the chambers, the palace of justice, the palace of the fine arts, the public library and museum, etc.; and has also a fine park of 17 acres, around which most of the principal buildings are situated. The lower town retains much of its ancient appearance. The hôtel de ville (1401-55) is an imposing Gothic structure, with a spire 364 feet in height, the square in front of it being perhaps the most pictorial of all the public places of Brussels. The cathedral of Saint Gude (dating in part from the 13th century) is the finest of many fine churches, richly adorned with sculptures and paintings. The whole town is rich in monuments and works of art. The institutions comprise a university, an academy of science and the fine arts and polytechnic school; one of the finest observatories in Europe; a conservatorium of music; a public library, containing 400,000 volumes and 30,000 MSS.; a picture-gallery with the finest specimens of Flemish art; and many learned societies and educational organizations. The manufactures and trade are greatly promoted by canal communications with Charleroi, Mechlin, Antwerp, and the ocean, and by the network of Belgian railways. The industries are varied and important. Lace was an ancient manufacture, and is still of great importance; the manufacture of cotton and woolen fabrics, paper, carriages, and many minor manufactures are carried on. There are breweries, distilleries, sugar-refineries, foundries, etc. The language spoken by the upper

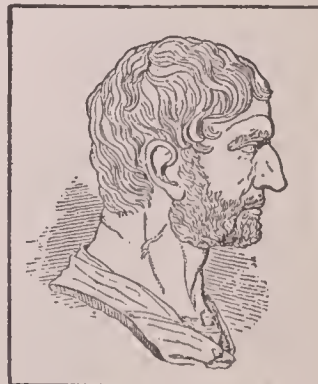
**BRUSSELS CARPET.** See Carpet.

**BRUTUS**, or **BRUTE**, the first king of Britain; a purely mythical personage, said to have been the son of Sylvius, and grandson of Ascanius, the son of Æneas. He landed in Devonshire, destroyed the giants then inhabiting Albion, and called the island from his own name. At his death the island was divided among his sons: Lochrine, Cumber, and Albanact.

**BRUTUS**, Decimus Junius, served under Julius Cæsar in Gaul, and was afterward commander of his fleet, but, like his relative, Marcus Junius Brutus, joined in the assassination of Cæsar. He was afterward for a short time successful in opposing Antony, but was deserted by his soldiers in Gaul and betrayed into the hands of his opponent, who put him to death in B.C. 43.

**BRUTUS**, Lucius Junius, ancient Roman hero, son of Marcus Junius by the daughter of the elder Tarquin. He saved his life from the persecutions of Tarquin the Proud by feigning himself insane, whence his name Brutus (stupid). On the suicide of Lucretia (see Lucretia), however, he threw off the mask, and headed the revolt against the Tarquins. Having secured their banishment, he proposed to abolish the regal dignity and introduce a free government, with the result that he was elected to the consulship, in which capacity he condemned his own sons to death for conspiring to restore the monarchy. He fell in battle B.C. 509.

**BRUTUS**, Marcus Junius, a distinguished Roman, born B.C. 85; was at first an enemy of Pompey, but joined him on the outbreak of civil war until



Marcus Junius Brutus.—Antique bust.



The law courts or Palais de Justice, Brussels.

ated on the small river Senne, which is not navigable, but serves as a canal-feeder. The city consists of a north-western or lower portion and a south-eastern or upper portion. The older

classes is French, and Flemish is that of the lower; but German, Dutch, and English are also a good deal spoken. Pop. 211,429, or, including suburbs, about 590,000.

the battle of Pharsalia. He then surrendered to Cæsar, who made him in the following year governor of Cisalpine Gaul, and afterward of Macedonia. He soon, however, joined the conspiracy against Cæsar, and by his influence insured its success. After the assassination he took refuge in the East, made himself master of Greece and Macedonia, and with a powerful army joined Cassius in the subjugation of the Lycians and Rhodians. In the meantime the triumvirs, Octavianus, Antony, and Lepidus, had been successful at Rome, and were prepared to encounter the army of the conspirators, which, crossing the Hellespont, assembled at Philippi in Macedonia. Cassius appears to have been beaten at once by Antony; and Brutus, though temporarily successful against Octavianus, was totally



defeated twenty days later. He escaped with a few friends; but, seeing that his cause was hopelessly ruined, fell upon the sword held for him by his confidant Strato, and died (B.C. 42).

**BRUYERE** (brü-yâr'), Jean de la, a French writer, born at Paris in 1645. Through the influence of Bossuet he was employed in the education of the Duke of Bourbon, grandson of the great Condé, with a pension of 3000 livres, and was attached to his person during the remainder of his life. In 1695 he was elected a member of the French Academy. He died in 1696.

**BRYAN**, William Jennings, an American politician, born at Salem, Ill., in 1860. He graduated in law at the Union College of Law in Chicago, and settled in Lincoln, Neb., in 1887. From 1891 to 1895 he was congressman from the Lincoln district; in 1896 he was nominated by the Chicago convention for president on the democratic ticket. Defeated by McKinley, he was again nominated in 1900, but was again defeated by McKinley. He subsequently founded *The Commoner*, a weekly paper which he still publishes. Bryan is one of the most appealing orators in the United States.

**BRYANT**, Henry Grier, an American traveler, born in Pennsylvania in 1859. In 1892 he was second in command of the Peary relief expedition to Greenland, and in 1894 was the commander of a similar expedition, also in 1897 commander of the expedition to Mount Elias.

**BRYANT**, William Cullen, an American poet and journalist, born in Hampshire, Mass., in 1794. At ten years of age he published translations from Latin poets; at thirteen wrote *The Embargo*;



William Cullen Bryant.

and at eighteen the *Thanatopsis*. In 1815 he was admitted to the bar, and practiced with success till 1825, when he established the *New York Review*. In 1826 he became assistant editor of the *Evening Post*, a leading organ of the New York democrats, of which he was long chief editor. His poems, first collected in 1832, took rank as the best America had up to that time produced. In 1842 he issued *The Fountain* and other poems; and a new edition of his poems in 1858 was followed by metrical translations of the *Iliad* in 1869 and of the *Odyssey* in 1871. His *Letters of a Traveller* record his visits to Europe

in 1834 and subsequently. He died in 1878.

**BRYN MAWR** (mär) **COLLEGE**, founded by Joseph W. Taylor, was incorporated in 1880, and opened for students in 1885, at Bryn Mawr, near Philadelphia. Bryn Mawr is distinctive among women's colleges in that its course and method of study are based upon the university model. The system of "major and minor electives in fixed combination" has been adopted; students are grouped in accordance with the work they have actually accomplished, instead of by arbitrary "classes"; original research is in all cases encouraged; and, in pursuance of the same policy of placing the scholarship of the college upon a basis of pure merit, candidates for admission as undergraduates are not accepted upon certificate, and honorary degrees are not granted. The college offers the graduate degrees of A.B., A.M., and Ph.D. Eleven resident fellowships, eight graduate scholarships, and three European fellowships are offered to graduate students, and there are also scholarships and a students' loan fund for undergraduates.

Bryn Mawr has grown rapidly since its foundation, and in 1902 had 45 professors and instructors, and a student body of 425.

**BUCCANEERS'**, a name derived from Carib boucan, a place for smoking meat, first given to European settlers in Hayti or Hispaniola, whose business was to hunt wild cattle and swine and smoke their flesh. In an extended sense it was applied to English and French adventurers, mostly seafaring people, who, combining for mutual defense against the arrogant pretensions of the Spaniards to the dominion of the whole of America, frequented the W. Indies in the 17th century, acquired predatory and lawless habits, and became ultimately, in many cases, little better than pirates. The earliest association of these adventurers began about 1625, but they afterward became much more formidable, and continued to be a terror until the opening of the 18th century, inflicting heavy losses upon the shipping trade of Spain, and even attacking large towns. Among their chief leaders were Montbars (Il exterminador), Peter the Great of Dieppe, L'Olonnas, de Busco, Van Horn, and the Welshman Henry Morgan, who, in 1670, marched across the Isthmus, plundered Panama, and, after being knighted by Charles II., became deputy-governor of Jamaica. The last great exploit of the buccaneers was the capture of Carthage in 1697, after which they are lost sight of in the annals of vulgar piracy.

**BUCEPH'ALUS**, the horse of Alexander the Great. On its death from a wound Alexander built over its grave, near the Hydaspes, a city called Bucephala.

**BUCHANAN**, Franklin, an American naval officer, born in Maryland in 1800, died in 1874. He served in the Mexican war, and was an officer on Perry's ship in the expedition to Japan. In 1861 he resigned from the United States navy, joined the confederate navy and commanded the *Merrimac* in the famous battle with the *Monitor* in Hampton

Roads. After the war he devoted himself to the life of an educator.

**BUCHANAN**, James, the fifteenth president of the United States, born in Stony Batter, Franklin Co., Pennsylvania in 1791, died in 1868. He was educated at Dickinson College and



James Buchanan.

qualified for the bar. In 1820 Buchanan became a member of congress, continuing in that capacity for ten years. He supported Jackson for president, was made minister to Russia, and in 1833 was elected United States senator. He held that congress had no power over slavery, but favored petition for abolition. In 1845 he became secretary of state in Polk's cabinet, and successfully handled the various territorial expansion questions of his time. In 1856 he was nominated for president by the democrats, defeating Fremont, the candidate of the newly-organized republican party. His administration was marked by much activity in diplomatic affairs, and successfully avoided the brewing trouble between the North and the South. He died at Lancaster, Pa.

**BUCHANAN**, Robert, an English poet, born in 1841. His earliest volumes of verse—*Undertones* (1863), *Idylls and Legends of Inverburn* (1865), and *London Poems* (1866)—gained him a good reputation for truth, simplicity, humor, and pathos, and he afterward produced various volumes of poetry which have been no less well received; such as *Wayside Poesies* (1866), *North Coast and other Poems* (1867); *The Drama of Kings* (1871); *Ballads of Life, Love, and Humour* (1882); *The City of Dream* (1888); *The Wandering Jew* (1893). He also wrote novels—*The Shadow of the Sword*, *God and the Man*, *The Child of Nature*, etc., and plays. He died in 1901.

**BUCHAREST**. See Bukarest.

**BUCHARIA**. See Bokhara.

**BUCK**, the male of the fallow-deer, of the goat, rabbit, and hare.

**BUCKBOARD**, a four-wheeled vehicle in which a long elastic board or platform is used in place of the ordinary body, springs, and gear. It is fixed as a connection between the fore and rear axles, and may have one or more seats. It is thus the most simply constructed of any four-wheeled vehicle. Buckboards were first used only in mountain districts where the roads are rugged, and



were for a long time rudely and simply built. When the Adirondack region and Mount Desert became fashionable resorts, the summer visitors to these places had the primitive buckboards reproduced in more elegant form by carriage-builders, so that the buckboard now usually seen differs greatly from the model, being made in handsome woods of a light color, ash or hickory, with springs, silver mountings, and cushions of russet leather.

**BUCKEYE**, an American name for certain species of horse-chestnuts.

**BUCK-HOUND**, a kind of hound similar to but smaller than a stag-hound, once commonly used in Britain for hunting bucks. The Master of the Buckhounds is still the title of an officer of the royal household in England.

**BUCKINGHAM**, an inland county of England, bounded by Northampton, Bedford, Hertford, Middlesex, Berks, and Oxford; area about 730 sq. miles, or 467,009 acres, of which over 400,000 are under crops or permanent pasture. The rich vale of Aylesbury stretches through the center, and a portion of the Chiltern range across the south of the county, which is watered by the Ouse, the Thame, and the Thames. The breeding and fattening of cattle and pigs are largely carried on, also the breeding of horses, and much butter is made. The manufactures are unimportant, among them being straw-plaiting, thread lace, and the making of wooden articles, such as beechen chairs, turnery, etc. There are also paper-mills, silk-mills, etc. The mineral productions are of no great importance. The county comprises eight hundreds, those of Stoke, Burnham, and Desborough being known as "the Chiltern Hundreds." Buckingham is nominally the county town, but Aylesbury is the assize town. Pop. 195,534.—Buckingham, the county town, a municipal, and, until 1885, a parl. borough, is pleasantly situated on a peninsula formed by the Ouse. Malting and tanning are carried on, and some lace is made. Pop. 3151.

**BUCKINGHAM**, George Villiers, Duke of, favorite of James I. and Charles I. of England, was born in 1592, his father being George Villiers, Knight. At eighteen he was sent to France, where he resided three years, and on his return made so great an impression on James I. that in two years he was made a knight, a gentleman of the bed-chamber, baron, viscount, Marquis of Buckingham, lord high-admiral, etc., and at last dispenser of all the honors and offices of the three kingdoms. In 1623, when the Earl of Bristol was negotiating a marriage for Prince Charles with the Infanta of Spain, Buckingham went with the prince incognito to Madrid to carry on the suit in person in the hope of securing the Palatinate as dowry. The result, however, was the breaking off of the marriage, and the declaration of war with Spain. During his absence Buckingham was created duke. After the death of James in 1625 he was sent to France as proxy for Charles I. to marry the Princess Henrietta Maria. In 1626, after the failure of the Cadiz expedition, he was impeached, but saved by the

favor of the king. Despite the difficulty in obtaining supplies Buckingham took upon himself the conduct of a war with France, but his expedition in aid of the Rochelle proved an entire failure. Aug. 24, 1628, he was stabbed by John Felton, an ex-lieutenant who had been disappointed of promotion.

**BUCKINGHAM PALACE**, a royal palace in London, facing St. James's Park, built in the reign of George IV., and forming one of the residences of the sovereign.

**BUCKLE**, Henry Thomas, English historical writer, born 1822. His chief work, a philosophic History of Civilization, of which only two volumes (1858 and 1861) were completed, was characterized by much novel and suggestive thought, and by the bold coordination of a vast store of materials drawn from the most varied sources. He died, while traveling, at Damascus, 1862.

**BUCKLER**, a kind of small shield formerly worn on the left arm, and varying in form and material, among the latter being wickerwork, wood covered with leather, a combination of wood and metal, etc.

**BUCKNER**, Simon Bolivar, an American politician and soldier, born in Kentucky in 1823. He graduated from West Point, served in the Mexican war, and was a brigadier-general of the Confederate army. In 1896 he was candidate for vice-president with John M. Palmer on the ticket of the gold wing of the democratic party.

**BUCK'RAM**, a coarse textile fabric stiffened with glue and used in garments to give them or keep them in the form intended. It is also used in binding books.

**BUCK-SHOT**, a kind of large leaden shot used for killing deer or other large game.

**BUCK'SKIN**, a kind of soft leather of a yellowish or grayish color, made originally from deer-skins, but now usually from sheep-skins. The softness which is its chief characteristic is imparted by using oil or brains in dressing it.

**BUCK'THORN**, the name of an extensive genus of trees and shrubs. Several species belong to N. America. The common buckthorn, a British and N. American shrub, grows to 7 or 8 feet, has strong spines on its branches, elliptical and serrated leaves, male and female flowers on different plants, a greenish-yellow calyx, no corolla, and a round black berry. It flowers in May. The berries are purgative, but harsh in action. The bark yields a yellow dye, the berries sap green.

**BUCK'WHEAT**, a plant with branched herbaceous stem, somewhat arrow-shaped leaves, and purplish-white flowers, growing to the height of about 30 inches, and bearing a small triangular grain of a brownish-black without and white within. The shape of its seeds gives it its German name Buchweizen, "beech-wheat," whence the English name. The plant was first brought to Europe from Asia by the Crusaders, and hence in France is often called Saracen corn. It grows on the poorest

soils. It is cultivated in China and other Eastern countries as a bread-corn. In Europe buckwheat has been principally cultivated as food for oxen, swine, and poultry; but in Germany it serves as an ingredient in pottage, puddings, and other food, and in America buckwheat cakes are common.

**BUD**, the name of bodies of various form and structure, which develop upon vegetables, and contain the rudiments of future organs, as stems, branches, leaves, and organs of fructification. Upon exogenous plants they are in their commencement cellular prolongations from the medullary rays, which force their way through the bark. In general a single bud is developed each year in the axil of each leaf, and there is one terminating the branch called a terminal bud. The life of the plant during winter is stored up in the bud as in an embryo, and it is by its vital action that on the return of spring the flow of sap from the roots is stimulated to renewed activity. Buds are distinguished into leaf-buds and flower-buds. The latter are produced in the axil of leaves called floral leaves or bracts. The terminal bud of a branch is usually a flower-bud, and as cultivation is capable of producing flower-buds in place of leaf-buds the one is probably a modification of the other.

**BUDAPEST** (-pesht'), the official name of the united towns of Pest and Buda or Ofen, the one on the left, the other on the right, of the Danube, forming the capital of Hungary, the seat of the imperial diet of the Hungarian ministry and of the supreme court of justice. Buda, which is the smaller of the two, and lies on the west bank of the river, consists of the fortified Upper Town on a hill, the Lower Town or Wasserstadt at the foot of the hill, and several other districts. The mineral baths of Buda have long been famous, the Bruckbad and Kaiserbad having both been used by the Romans. Pest, or the portion of Budapest on the left or east bank of the river, is formed by the inner town of Old Pest on the Danube, about which has grown a semicircle of districts—Leopoldstadt, Theresienstadt, Elizabethstadt, etc. There is a well-attended university. In commerce and industry Budapest ranks next to Vienna in the empire. Its chief manufactures are machinery, gold, silver, copper, and iron wares, chemicals, silk, leather, tobacco, etc. A large trade is done in grain, wine, wool, cattle, etc. Budapest is strongly Magyar, and as a factor in the national life may almost be regarded as equivalent to the rest of Hungary. It was not until 1799 that the population of Pest began to outdistance that of Buda; but from that date its growth was very rapid and out of all proportion to the increase of Buda. In 1799 the joint population of the two towns was little more than 50,000; in 1900 it was 713,383.

**BUDA'UN**, a town of India, United Provinces, consisting of an old and a new town, the former partly surrounded by ancient ramparts; there is a handsome mosque, American mission, etc. Pop. 39,031. The district of Budaun



has an area of 2017 sq. miles, and a pop. of 925,598.

**BUDDHA** (bud'ha), the sacred name of the founder of Buddhism, an Indian sage who appears to have lived in the 5th century B.C. His personal name was Siddhartha, and his family name Gautama; and he is often called also Sakya-muni. His father was King of Kapilavastu, a few days' journey north of Benares. Siddhartha, filled with a deep compassion for the human race, left his father's court, and lived for years in solitude till he had penetrated the mysteries of life, and become the Buddha. He then began to teach his new faith, in opposition to the prevailing Brahmanism, commencing at Benares. Among his earliest converts were the monarchs of Magadha and Kosala, in whose kingdoms he chiefly passed the latter portion of his life, respected, honored, and protected. See Buddhism.

**BUDDHISM**, the religious system founded by Buddha, one of the most prominent doctrines of which is that Nirvāna, or an absolute release from existence, is the chief good. According to it pain is inseparable from existence, and consequently pain can cease only through Nirvāna; and in order to attain Nirvāna our desires and passions must be suppressed, the most extreme self-renunciation practiced, and we must, as far as possible, forget our own personality. In order to attain Nirvāna eight conditions must be kept or practiced. The first is in Buddhistic language right view; the second is right judgment; the third is right language; the fourth is right purpose; the fifth is right profession; the sixth is right application; the seventh is right memory; the eight is right meditation. The five fundamental precepts of the Buddhist moral code are: not to kill, not to steal, not to commit adultery, not to lie, and not to give way to drunkenness. To these there are added five others of less importance, and binding more particularly on the religious class, such as to abstain from repasts taken out of season, from theatrical representations, etc. There are six fundamental virtues to be practiced by all men alike, viz., charity, purity,



Buddha—From a Burmese bron ze

patience, courage, contemplation, and knowledge. These are the virtues that are said to "conduct a man to the other shore." The devotee who strictly practices them has not yet attained Nirvāna, but is on the road to it. The Buddhist

virtue of charity is universal in its application, extending to all creatures, and demanding sometimes the greatest self-denial and sacrifice. There is a legend that the Buddha in one of his stages of existence (for he had passed through



Singhalese Buddhist priests and dagobah at Kandy.

innumerable transmigrations before becoming "the enlightened") gave himself up to be devoured by a famishing lioness which was unable to suckle her young ones. There are other virtues less important, indeed, than the six cardinal ones, but still binding on believers. Thus not only is lying forbidden, but evil-speaking, coarseness of language, and even vain and frivolous talk, must be avoided. Buddhist metaphysics are comprised in three theories—the theory of transmigration (borrowed from Brahmanism), the theory of the mutual connection of causes, and the theory of Nirvāna. The first requires no explanation. According to the second, life is the result of twelve conditions, which are by turns causes and effects. Thus there would be no death were it not for birth; it is therefore the effect of which birth is the cause. Again, there would be no birth were there not a continuation of existence. Existence has for its cause our attachment to things, which again has its origin in desire; and so on through sensation, contact, the organs of sensation and the heart, name and form, ideas, etc., up to ignorance. This ignorance, however, is not ordinary ignorance, but the fundamental error which causes us to attribute permanence and reality to things. This, then, is the primary origin of existence and all its attendant evils. Nirvāna or extinction is eternal salvation from the evils of existence, and the end which every Buddhist is supposed to seek. Sakya-muni did not leave his doctrines in writing; he declared them orally, and they were carefully treasured up by his disciples, and written down after his death. The determination of the canon of the Buddhist scriptures as we now possess them was the work of three successive councils, and was finished two centuries at least

before Christ. From Buddhism involving a protest against caste distinctions it was eagerly adopted by the Dasyus or non-Aryan inhabitants of Hindustan. It was pure, moral, and humane in its origin, but it came subsequently to be mixed up with idolatrous worship of its founder and other deities. Although now long banished from Hindustan by the persecutions of the Brahmans, Buddhism prevails in Ceylon, Burmah, Siam, Anam, Tibet, Mongolia, China, Java, and Japan, and its adherents are said to comprise about a third of the human race.

**BUDDING**, the art of multiplying plants by causing the leaf-bud of one species or variety to grow upon the branch of another. The operation consists in shaving off a leaf-bud, with a portion of the wood beneath it, which portion is afterward removed by a sudden jerk of the operator's finger and thumb, aided by the budding-knife. An incision in the bark of the stock is then made in the form of a T; the two side lips are pushed aside, the bud is thrust between the bark and the wood, the upper end of its bark is cut to a level with the cross arm of the T, and the whole is bound up with worsted or other soft fastening, the point of the bud being left exposed. In performing the operation, a knife with a thin flat handle and a blade with a peculiar edge is required. The bud must be fully formed; the bark of the stock must separate readily from the wood below it; and young branches should always be chosen, as having beneath the bark the largest quantity of cambium or viscid matter out of which tissue is formed. The maturer shoots of the year in which the operation is performed are the best. The autumn is the best time for budding, though it may also be practiced in the spring.

**BUELL**, Don Carlos, an American soldier, born in Ohio in 1818, died in 1898. He was graduated at West Point, fought in the Mexican war, and was brigadier-general of the Union forces



D. C. Buell.

(volunteer) at the beginning of the civil war, and later brigadier-general. He took part in several of the great battles of the civil war, and was subsequently appointed pension agent.

**BUENOS AYRES** (by-en'ōs i'rās), a city of S. America, capital of the Argentine Republic, on the s.w. side of the La Plata, 150 miles from its mouth. It was founded in 1535 by Don Pedro de Mendoza, and is built with great regularity, the streets uniformly crossing each other at right angles. It contains the palace of the president, the house of



representatives, a town-hall, a number of hospitals and asylums, a cathedral, several monasteries, nunneries, and Catholic and Protestant churches; several theaters, a university, and a custom-house. The university, founded in 1821, is attended by about 800 students. There are also a medical school, normal and other schools, besides literary and scientific societies. Formerly large vessels could only come within 8 or 9 miles of the town, but they can now come up to it and enter the extensive docks that have been constructed, about \$25,000,000 having been spent on harbor works and channels. La Plata (capital of the province), 30 miles lower down the estuary, serves as a subport. Buenos Ayres is one of the leading commercial centers of S. America. Chief exports are wool, wheat, maize, meat, hides and skins, tallow, etc. There are six railways running from the city, and 100 miles of tramway in the city and suburbs. About one-fourth of the inhabitants are whites; the rest are of mixed blood or Indians, negroes, etc. Pop. in 1900, 795,323.—The province of Buenos Ayres has an area of 177,777 sq. miles, and consists mostly of level or slightly undulating plains (pampas), which afford pasture to vast numbers of cattle, sheep, and horses. Pop. 1,140,067.

**BUFFALO**, an ungulate or hoofed ruminant mammal, family Bovidae or oxen, the best-known species of which is the common or Indian buffalo, larger than the ox and with stouter limbs, origi-



1, Head of Cape buffalo.  
2, Head of Indian buffalo.

nally from India, but now found in most of the warmer countries of the Eastern Continent. A full-grown male is a bold and powerful animal, quite a match for the tiger. The buffalo is less docile than the common ox, and is fond of marshy places and rivers. It is, however, used in tillage, draft, and carriage in India, Italy, etc. The female gives much more milk than the cow, and from the milk the ghee or clarified butter of India is made. The hide is exceedingly tough, and a valuable leather is prepared from it, but the flesh is not very highly esteemed. Another Indian species is the arnee, the largest of the ox family. The Cape buffalo is distinguished by the size of its horns, which are united at their bases, forming a great bony mass on the front of the head. It attains a greater size than an ordinary ox. The name is also applied to wild oxen in general, and particularly to the bison of N. America. See Bison.

**BUFFALO**, a city of the state of New York, situated on Lake Erie, and by virtue of its position one of the principal ports of the country. It is 400 miles from New York, 500 miles from Chicago, and only 20 miles from Niagara Falls. Its population in 1908 was 400,000. The city has an area of 42 square miles.

Buffalo is one of the most marked of large American cities in its recent development, and owes its prosperity to commerce. Several great steamship lines and innumerable independent vessels ply to the chief ports on the Great Lakes, and there are several ferries to the Canada side, besides the International Bridge, completed at a cost of \$1,500,000. The city is connected with the tide-waters of the Hudson by the Erie Canal, and with ports on Lake Ontario and the Saint Lawrence river by the Welland Canal, and is also the terminus or connecting-point of a score of railroads. The commerce of Buffalo by these various means of transportation is very great. With a season of only about 246 days in the year, Buffalo ranks with the leading American and European ports in extent of traffic. The immense quantity of flour and grain moved from the Western States to the seaboard constitutes the most important feature of its commerce; but live stock, lumber, and coal, iron ore, and fish, also, are of importance. Some part of the lumber and iron ore which arrive at this end of Lake Erie is received at Tonawanda, a suburb to the north, on Niagara river, but Buffalo receives large quantities of each. Over 15,000,000 pounds of fish are received annually, mainly from Georgian Bay, and are distributed as far east as Boston and as far west as Denver. The horse market and sheep market of Buffalo are the largest in the U. States, and in the trade in cattle and hogs Buffalo is among the leading American cities. In the production of foundry and machine-shop products, including stoves, nails, etc., and agricultural implements, the city ranks among the foremost. Other industries are slaughtering and meat-packing, refining petroleum, and ship-building; clothing, flouring- and grist-mill products, brick, stone, lime, and stucco, malt and distilled liquors, soap and candles, starch, furniture, and tobacco and cigars, are extensively produced.

**BUFFALO-GRASS**, a strong-growing N. American grass, so called from forming a large part of the food of the buffalo, and said to have excellent fattening properties.

**BUFFER**, any apparatus for deadening the concussion between a moving body and the one on which it strikes. In railway-carriages they are placed in pairs at each end, and are fastened by rods to springs under the frame-work to deaden the concussions caused when the velocity of part of the train is checked.

**BUFFET**, a cupboard, sideboard, or closet to hold china, crystal, plate, and the like. The word is also very commonly applied to the space set apart for refreshments in public places.

**BUFF LEATHER**, a sort of leather prepared from the skin of the buffalo and other kinds of oxen, dressed with oil, like shammy. It is used for making bandoliers, belts, pouches, gloves, and other articles.

**BUFFON** (bu-fōn), George Louis Leclerc, Count de, celebrated French naturalist, was born at Montbard, in Burgundy, 1707; died in Paris 1788. In 1739 he was appointed superintendent of the Royal Garden at Paris (now the Jardin des Plantes), and devoted himself to the great work on Natural History, which occupied the most of his life. It is now obsolete and of small scientific value, but it for long had an extraordinary popularity, and was the means of diffusing a taste for the study of nature throughout Europe. After an assiduous labor of ten years the three first volumes were published, and between 1749 and 1767 twelve others, which comprehend the theory of the earth, the nature of animals, and the history of man and the Mammalia. In these Buffon was assisted by Daubenton in the purely anatomical portions. Buffon was raised to the rank of count by Louis XV., whose favor, as also that of Louis XVI., he enjoyed. His works were translated into almost every European language.

**BUFFOON**, a merry-andrew, a clown, a jester.

**BUFORD**, John, an American soldier, born in Kentucky in 1826, died in 1863. He was graduated at West Point, fought in the Indian wars, and was a brigadier-general in the Union army during the civil war. He was one of the most brilliant of the minor generals in American history.

**BUG**, a name given to the house-bug or bedbug, or any member of this genus or of the family Cimicidae. The common bug is about  $\frac{3}{16}$  inch long, wingless, of a roundish depressed body, dirty rust color, and emits an offensive smell when touched. The female lays her eggs in summer in the crevices of bedsteads, furniture, and walls of rooms. Its larvæ are small, white, and semi-transparent. They attain full size in eleven weeks. The mouth of the bug has a three-jointed proboscis, which forms a sheath for a sucker. It is fond of human blood, but eats various other substances.

**BUGGY**, a name given to several species of carriages or gigs: in England, a light one-horse two-wheeled vehicle without a hood; in the U. States, a light one-horse four-wheeled vehicle, with or without a hood or top; in India, a gig with a large hood to screen those who travel in it from the sun's rays.

**BU'GLE**, a military musical brass wind-instrument of the horn kind, sometimes furnished with keys or valves. It is used in the American and other armies to sound signal-calls. The name is an abbreviation of bugle-horn, that is, buffalo-horn.

**BUGLE**, a shiny elongated glass bead, usually black, used in decorating female apparel and also in trafficking with savage tribes.

**BUILDING ACTS**, laws restricting the rights of land owners in the matter of improving their land with buildings.



They generally have to do with the height, stability, material, sanitation, etc., of proposed structures.

**BUILDING AND LOAN ASSOCIATIONS**, societies the purpose of which is to encourage and assist individuals in buying, building, and paying for a home. They were in existence in England as early as 1781, but were first introduced in the U. States in 1831.

Five states, New York, Massachusetts, New Jersey, Ohio, and Illinois, require these associations to make annual returns, the same as is required of savings banks. In all the other states no control whatsoever is exercised over them.

**BUILDING LOANS**, loans made to owners of land who desire to build upon the land. They are usually secured by a mortgage on the whole property.

**BUILDING STONE**, stone used in the construction of buildings of any kind, of bridges, walls, or other structures in which stone can be used. The principal building stones are granite, limestones of various kinds, marbles, sandstones, and slate. Granite is the most enduring of stones, as it is not so easily affected by weather. The granite quarries of the U. States are practically inexhaustible, and the natural resources of the country in respect to the other stones used for building are unsurpassed in the world.

**BUKAREST**, the capital of Roumania, situated on the Dimbovitza about 33 miles north of the Danube, in a fertile plain. It is in general poorly built, among the chief buildings being



A street in Bukarest.

the royal palace, the National Theater, the university buildings, the National Bank, the Mint, and the Archiepiscopal Church. There are handsome public gardens. Manufactures are varied but unimportant; the trade is considerable, the chief articles being grain, wool, honey, wax, wine, hides. The mercantile portion of the community is mostly foreign, and the whole population presents a curious blending of nationalities. Bukarest became the capital of Walachia in 1665, in 1862 that of the united principalities of Walachia and Moldavia. A treaty was concluded here in 1812 between Turkey and Russia by which the former ceded Bessarabia and part of Moldavia. Pop. 282,071.

**BUKOWINA** (bō-ko-vē'nā), an Austrian duchy, forming the southeastern corner of Galicia. Area, 4035 sq. miles; pop. 571,671. It is traversed by ramifi-

cations of the Carpathians, and much of the surface is occupied with swamps and forests. Chief town, Czernowitz.

**BULANDSHAHR** (by-land-shār'), a district of India, United Provinces, in the alluvial plain between the Ganges and the Jumna; producing cotton, indigo, sugar, etc. Area, 1911 sq. miles; pop. 949,914.—Bulandshahr, the capital, has a pop. of 16,900.

**BULB**, a modified leaf-bud, formed on a plant upon or beneath the surface of the ground, emitting roots from its base, and producing a stem from its center. It is formed of imbricated scales or of concentric coats or layers. It incloses the rudiments of the future plant and a store of food to nourish it. Examples of bulbs are the onion, lily, hyacinth, etc.

**BULGARIA**, a principality tributary to Turkey, constituted by the first article of the Treaty of Berlin, July 13, 1878, and placed under the suzerainty of the sultan. It is bounded north by Roumania and the Dobrudsha, east by the Black Sea, south by the Balkan Mountains, which separate it from Eastern Rumelia, and west by Servia. The principal towns are Widdin, Sofia, Plevna, Sistova, Tirnova, Rustchuk, Shumla, Varna, and Silistria. The country almost wholly belongs to the north slope of the Balkans, and is intersected by streams flowing from that range to the Danube. It possesses much good agricultural land and a good climate; but cultivation is backward, though the rearing of cattle and horses is successfully carried on. Agricultural produce is exported, manufactured goods imported. Education is backward, but is improving; four years' school attendance is obligatory in principle. The prevalent religion is that of the Greek Church. The revenue and expenditure are each about \$20,000,000. Military service is obligatory; the war strength of the army is about 130,000. In accordance with the Treaty of Berlin a constitution was drawn up by an assembly of Bulgarian notables in 1879. By this constitution, as subsequently amended, the legislative authority is vested in a single chamber, called the Sobranje or National Assembly, elected by manhood suffrage for five years, the members being now one for every 20,000 of the population. The capital is Sofia. On the 29th of April, 1879, Prince Alexander of Battenberg, cousin of the Grand-duke of Hesse, was elected prince by unanimous vote of the constituent assembly. In 1885 a national rising took place in Eastern Rumelia, the Turkish governor was expelled, and union with Bulgaria proclaimed. In consequence Servia demanded an addition to her own territory, and began a war against Bulgaria (Nov., 1885), in which she was severely defeated. By the treaty which followed, the Prince of Bulgaria was appointed governor-general of Eastern Rumelia for a term of five years, to be renominated at the end of that time by sanction of the great powers. These events greatly irritated Russia, whose agents managed to seduce certain regiments of Bulgarians; and in August, 1886, the prince was seized and carried

off, while a proclamation was issued to the effect that he had abdicated. When he was set free on Austrian territory he discovered that the people were still with him, and determined to return. Seeing, however, that his presence would cause an immediate interference on the part of Russia he formally abdicated and left the country (7th Sep., 1886). In 1887 Prince Ferdinand of Saxe-Coburg accepted an invitation to occupy the throne and the six great powers sanctioned the step. In 1908 Bulgaria proclaimed its independence. The area of Bulgaria proper is 24,440 sq. miles of Eastern Rumelia or southern Bulgaria, 13,500 sq. miles. The total pop. is 3,733,189.

**BULGARIANS**, a race of Finnish origin, whose original seat was the banks of the Volga, and who subdued the old Mæsan population and established a kingdom in the present Bulgaria in the 7th century. They soon became blended with the conquered Slavs, whose language they adopted. In the 14th century the country was conquered by the Turks, and has until lately remained part of the Ottoman Empire. (See Bulgaria.) The Bulgarian language is divided into two dialects, the old and the new; the former is the richest and best of the Slavonic tongues, and although extinct as a living tongue is still used as the sacred language of the Greek Church. The Bulgarians are now spread over many parts of the Balkan peninsula.

**BULK-HEADS**, partitions built between the several portions of the interior of a ship, whether to separate it into rooms, or as a safeguard in case of wreck.

**BULL**, a letter, edict, or rescript of the pope, published or transmitted to the churches over which he is head, containing some decree, order, or decision, and in many cases having a leaden seal attached, impressed on one side with the heads of St. Peter and St. Paul, on the other with the name of the pope. The document is in Latin and on parchment.

**BULL**, the name given to the male of any bovine quadruped.

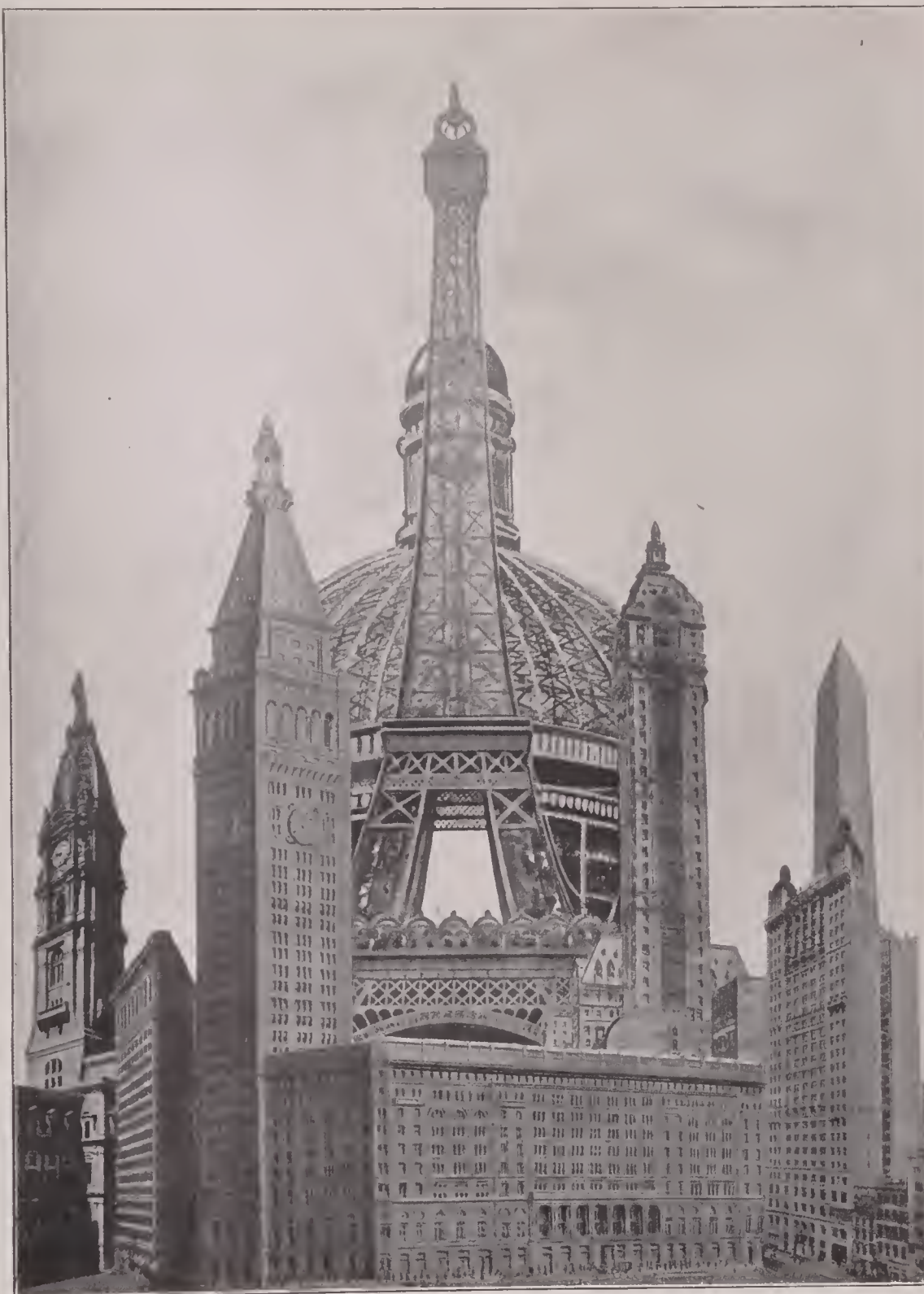
**BULL**, John, the English nation personified, and hence any typical Englishman: first used in Arbuthnot's satire, *The History of John Bull*, designed to ridicule the Duke of Marlborough; and in which the French are personified as Lewis Baboon, the Dutch as Nicholas Frog, etc.

**BULL**, Ole Bornemann, famous violinist, born at Bergen, in Norway, 1810; died 1880. He secured great triumphs both throughout Europe and in America by his wonderful playing.

**BULL-BAITING**, the barbarous sport of setting dogs on a bull, which is tied to a stake and worried by the dogs for the amusement of the spectators. It was a favorite sport in England from a very early period till it was finally put down by act of parliament in 1835.

**BULLDOG**, a variety of the common dog, remarkable for its short, broad muzzle, and the projection of its lower jaw, which causes the lower front teeth to protrude beyond the upper. The head is massive and broad: the lips are





A GROUP OF THE WORLD'S HIGHEST BUILDINGS.

The Eiffel Tower in Paris is still the world's tallest structure, being 984 feet, but as will be seen from the illustration, the greater part of it is purely ornamental and serves no useful purpose. Behind is shown the Friede Globe Tower, built at Coney Island and completed in 1908. It is 700 feet high and is visible from Manhattan Island. At the left is the highest building in the world occupied for business purposes, the Metropolitan Life Insurance Building, Madison Square, New York, 683 feet high and completed in 1907. At the right is the tower of the Singer Sewing Machine Company in lower Broadway which will be 593 feet high, and which also will be occupied for business purposes. At the extreme right is the Washington monument, 555, feet; at the extreme left is the Philadelphia City Hall tower, 547 feet. In the foreground at the right is the Park Row Building in New York, 382 feet high, and to the left of the Metropolitan is the Flat-Iron building at 23d street and Broadway, New York, 286 feet.







thick and pendulous; the ears pendent at the extremity; the neck robust and short; the body long and stout; and the legs short and thick. The bulldog is a slow-motivated, ferocious animal, better suited for savage combat than for any purpose requiring activity and intelligence. For this reason he is often employed as a watch-dog. It was formerly used—as its name implies—for the barbarous sport of bull-baiting.—The bull terrier was originally from a cross between the bulldog and the terrier. It is smaller than the bulldog, lively, docile, and very courageous.

**BULLEN**, Anne. See Boleyn.

**BULLER**, Sir Henry Redvers, a British soldier, born in 1839, commander of the army in South Africa during the early part of the Anglo-Boer war in 1898. His command was marked by numerous disasters and defeats, and his military reputation totally annihilated. He was soon afterward retired from the service. Died in 1908.

**BULLET** (bul'et), a projectile intended to be discharged from firearms or other missile weapons; more especially, one for a rifle, musket, fowling-piece, pistol, or similar firearm. Bullets used to be solid spherical masses, but of late many changes have been made in their shape and structure. Bullets used for rifles of recent construction are elongated and generally rounded, conical, or ogival at the apex, somewhat like half an egg drawn out, often with a hollow at the base, into which a plug of wood or clay is inserted. When the rifle is fired the plug is driven forward, forcing the base of the bullet outward till the lead catches the grooves of the barrel.

**BULLETIN** (bul'e-tin), an authenticated official report concerning some public event, such as military operations, the health of the sovereign or other distinguished personage, issued for the information of the public. The name is also given to some periodical publications recording the proceedings of learned societies.

**BULLET-TREE**, or **BULLY-TREE**, a forest tree of Guiana and neighboring regions yielding an excellent gum (the concentered milky juice) known as balata, having properties giving it in some respects an intermediate position between gutta-percha and india-rubber, and making it for certain industrial purposes more useful than either. In the U. States it is used as a chewing material. The timber of the tree is also valuable.

**BULL-FIGHTS** are among the favorite diversions of the Spaniards. They are usually held in an amphitheater having circular seats rising one above another, and are attended by vast crowds who eagerly pay for admission. The combatants, who make bull-fighting their profession, march into the arena in procession. They are of various kinds—the picadores, combatants on horseback, in the old Spanish knightly garb; the chulos or banderilleros, combatants on foot, in gay dresses, with colored cloaks or banners; and lastly, the matador (the killer). As soon as the signal is given the bull is let into the arena. The picadores, who have stationed themselves near him, commence the attack

with their lances, and the bull is thus goaded to fury. Sometimes a horse is wounded or killed (only old worthless animals are thus employed), and the rider is obliged to run for his life. The chulos assist the horsemen by drawing the attention of the bull with their cloaks; and in case of danger they save themselves by leaping over the wooden fence which surrounds the arena. The banderilleros then come into play. They try to fasten on the bull their banderillas—barbed darts ornamented with colored paper, and often having squibs or crackers attached. If they succeed, the squibs are discharged, and the bull races madly about the arena. The matador or espada now comes in gravely with a naked sword, and a red flag to decoy the bull with, and aims a fatal blow at the animal. The slaughtered bull is dragged away, and another is let out from the stall. Several bulls are so disposed of in a single day.

**BULLFINCH**, an insessorial bird, with short thick rounded bill, beak and crown of the head black, body bluish-gray above and bright tile-red below. It



Bullfinch.

occurs in Britain, in the middle and south of Europe, and in Asia, and when tamed may be taught to sing musical airs.

**BULLFROG**, a large species of frog found in North America, 8 to 12 inches long, of a dusky-brown color mixed with a yellowish green, and spotted with black. These frogs live in stagnant water, and utter a low croaking sound resembling the lowing of cattle, whence the name.

**BULLHEAD**, the popular name of certain fishes. One of these, a British fish, is about 4 inches long, with head very large and broader than the body. The armed bull-head is found in the Baltic and northern seas; the six-horned bull-head is a North American species. In America this name is called also Cat-fish and Horned-pout.

**BUL'LION** is uncoined gold or silver, in bars, plate, or other masses, but the term is frequently employed to signify the precious metals coined and uncoined.

**BULL RUN**, a stream in the n.e. of Virginia, flowing into the Occoquan river, 14 miles from the Potomac; the scene of two great battles during the American civil war in which the Federals were defeated. The first battle was fought 21st July, 1861; and the second on 30th August, 1862.

**BULLS AND BEARS**, in stock-exchange slang, manipulators of stocks; the former operating in order to effect a rise in price, the latter doing all they can to bring prices of stock down.

**BULL'S-EYE**, (1) a round piece of thick glass, convex on one side, inserted into the decks, ports, scuttle-hatches, or skylight-covers of a vessel for the purpose of admitting light. (2) A small lantern with a lens in one side of it to concentrate the light in any desired direction. (3) In rifle shooting, the center of a target, of a different color from the rest of it and usually round.

**BULOW** (bü'le), Friedrich Wilhelm von, Prussian general, born 1755, died 1816. He was actively engaged against the French at the earliest periods of the revolutionary war; and his services in 1813 and 1814, especially at Grosbeeren and Dennewitz, were rewarded with a Grand Knighthip of the Iron Cross and the title Count Bülow von Dennewitz. As commander of the fourth division of the allied army he contributed to the victorious close of the battle of Waterloo.

**BULOW** (bü'le), Hans Guido von, pianist and composer, born at Dresden 1830. He studied the piano under Liszt, and made his first public appearance in 1852. In 1855 he became leading professor in the Conservatory at Berlin; in 1858 was appointed court pianist; and in 1867 he became musical director to the King of Bavaria. His compositions include overture and music to Julius Cæsar, The Minstrel's Curse, and Nirwana; songs, choruses, and pianoforte pieces. He was considered one of the first of pianists and orchestral conductors. He died in 1894.

**BULOZ** (bü-loz), François, born near Geneva, Switzerland, 1803, died at Paris 1877; founder and editor of the Revue des Deux Mondes, the celebrated French fortnightly literary magazine.

**BULRUSH** (bul'-), the popular name for large rush-like plants growing in marshes, not very definitely applied. Some authors apply the name to cat's-tail or reed-mace. But it is more generally restricted to a tall rush-like plant from which the bottoms of chairs, mats, etc., are manufactured.

**BULWER** (bul'-), Sir Henry Lytton, Lord Dalling and Bulwer, diplomatist and author, elder brother of Lord Lytton, born 1804, died 1872. He was attached to the British embassies at Berlin, Brussels, and the Hague from 1827 to 1830, when he entered parliament. In 1837 he was sent as secretary of legation to Constantinople; subsequently he was minister at Madrid and Washington; and he succeeded Lord Stratford de Redcliffe as ambassador at the Porte (1858-65). He wrote, among others, France, Social, Literary, and Political; Life of Byron, Life of Palmerston, and Historical Characters. He was raised to the peerage in 1871.

**BULWER LYTTON**. See Lytton, Lord.

**BUM-BOAT**, a small boat used to sell vegetables, etc., to ships lying at a distance from shore.

**BUMPUS**, Herman Carey, an American anatomist and zoologist, born in Maine in 1862. He is director of the



biological laboratory at Am. Mus. Natural History, New York.

**BUNCE**, Francis Marvin, an American admiral, born in Connecticut in 1836. He was graduated at Annapolis in 1857, was wounded at the siege of Charleston in 1863, and was commander of the monitor *Monadnock* from Philadelphia to San Francisco in 1865. In 1898 he was retired with the rank of rear admiral.

**BUNCO**, a word used to designate a species of swindling practiced by city sharpers on strangers. The stranger is led to believe that the "bunco man" is acquainted with people of influence in the stranger's locality, and in one way or another is then fleeced of money.

**BUNCOMBE**, **BUNKUM**, a county in South Carolina; area, 450 sq. miles; pop. 21,910. The term Bunkum, meaning talking for talking's sake, bombastic speech-making, is said to have originated with a congressional member for this county, who declared that he was only talking for Buncombe, when attempts were made to cut his oratory short.

**BUNDELCUND**, a tract of country in Upper India lying between the river Jumna on the n., and the Chambal on the n. and w.; area, 20,658 sq. miles; pop. 3,779,627. It comprises the British districts of Hamirpur, Jalaun, Jhansi, Lalitpur, and Banda, and thirty-one native states.

**BUNDESRATH** (bun'des-rät), the German federal council which represents the individual states of the empire, as the Reichstag represents the German nation. It consists of sixty-two delegates, and its functions are mainly those of a confirming body, although it has the privilege of rejecting measures passed by the Reichstag.

**BUN'GALOW**, in India, a house or residence, generally of a single floor. Native bungalows are constructed of wood, bamboos, etc.; but those erected



Bungalow on Penang hills.

by Europeans are generally built of sun-dried bricks, and thatched or tiled, and are of all styles and sizes, but invariably surrounded by a veranda.

**BUN'ION**, an enlargement and inflammation of the joint of the great toe arising from irritation of the small membranous sac called bursa mucosa.

**BUNK**, a wooden box or case serving as a seat during the day and a bed at night; also one of a series of sleeping berths arranged above each other.

**BUNKER HILL**, a small eminence in Charlestown, now a part of Boston, Mass.; scene of the first important battle in the revolutionary war, fought June 17, 1775. A considerable body of Americans having been sent to occupy

the peninsula on which Charlestown stands, a British force was sent to dislodge them. This was not effected till after three assaults on their intrenched position, with a loss of 1000 men, while the Americans did not lose half that number.

**BUNKUM**. See Buncombe.

**BUNSEN**, Robert Wilhelm Eberard, eminent German chemist, born at Göttingen 1811. Among his many discoveries and inventions are the production of magnesium in quantities, magnesium light, spectrum analysis, the Bunsen burner, etc. He died in 1899.

**BUNSEN'S BURNER**, a form of gas burner especially adapted for heating, consisting of a tube, in which, by means of holes in the side, the gas becomes mixed with air before consumption so that it gives a non-illuminating smokeless flame.

**BUNT'ING**, a thin woolen stuff, of which the colors and signals of a ship are usually formed; hence, a vessel's flags collectively.

**BUN'YAN**, John, author of the *Pilgrim's Progress*, was the son of a tinker, and was born at the village of Elstow, near Bedford, in 1628, died in London 1688. He followed his father's employment, but during the civil war he served as a soldier. Returning to Elstow, after much mental conflict his mind became impressed with a deep sense of the truth and importance of religion. He joined a society of Anabaptists at Bedford, and at length undertook the office of a public teacher among them. Acting in defiance of the severe laws against dissenters, Bunyan was detained in prison for twelve years (1660-72), but was at last liberated, and became pastor of the community with which he had previously been connected. During his imprisonment he wrote *Profitable Meditations*, *The Holy City*, etc., and also the curious piece of autobiography entitled *Grace Abounding to the Chief of Sinners*. In 1675 he was sent to prison for six months under the Conventicle Act. To this confinement he owes his chief literary fame, for in the solitude of his cell he produced the first part of that admired religious allegory, the *Pilgrim's Progress*. His *Holy War*, his other religious parables, and his devotional tracts, which are numerous, are also remarkable, and many of them valuable. On obtaining his liberty Bunyan resumed his functions as a minister at Bedford, and became extremely popular. He died when on a visit to London.

**BUONAPARTE**. See Bonaparte.

**BUONAROTTI** (by-o-ná-rot'tē), Michael Angelo, of the ancient family of the counts of Canossa, born at Caprese, in Tuscany, 1475, died at Rome 1563; a distinguished Italian painter, sculptor, architect, and poet. Having distinguished himself both in sculpture and painting, he was commissioned (together with Leonardo da Vinci) to decorate the senate-hall at Florence with a historical design, but before it was finished, in 1505, he was induced by Pope Julius II. to settle in Rome. Here he sculptured the monument of the pontiff (there are seven statues belonging to it) now in the church of St. Pietro in Vin-

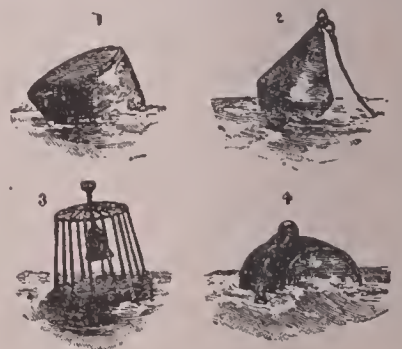
coli; and painted the dome of the Sistine Chapel, his frescoes representing the creation and the principal events of sacred history. In 1530 he took a leading part in the defense of Florence



Michael Angelo Buonarrotti.

against Charles V. Three years later he began his great picture in the Sistine Chapel, the *Last Judgment*, which occupied him eight years. His last considerable works in painting were two large pictures: the *Conversion of St. Paul* and the *Crucifixion of St. Peter* in the Pauline Chapel. In sculpture he executed the *Descent of Christ from the Cross*, four figures of one piece of marble. His statue of *Bacchus* was thought by Raphael to possess equal perfection with the masterpieces of Phidias and Praxiteles. As late as 1546 he was obliged to undertake the continuation of the building of St. Peter's, and planned and built the dome, but he did not live long enough to see his plan finished, in which many alterations were made after his death. Besides this, he undertook the building of the *Piazza del Campidoglio* (Capitol), of the *Farnese Palace*, and of many other edifices. His style in architecture is distinguished by grandeur and boldness, and in his ornaments the untamed character of the imagination frequently appears, preferring the uncommon to the simple and elegant.

**BUOY** (boi), any floating body employed to point out the particular situation of a ship's anchor, a shoal, the direction of a navigable channel, etc.



Buoys.

1, Can-buoy. 2, Nun-buoy. 3, Bell-buoy. 4, Mooring-buoy.

They are made of wood, or now more commonly of wrought-iron plates riveted together and forming hollow chambers. They are generally moored by chains to the bed of the channel, etc.



## BURBANK

They are of various shapes, and receive corresponding names; thus there are the can-buoy, the nun-buoy, the bell-buoy, the mooring-buoy, as represented in the accompanying cuts. The name is also given to a floating object intended to keep a person afloat till he can be taken from the water: more particularly called a life-buoy.

**BURBANK**, Luther, an American plant grower, born in Massachusetts in 1849, and since 1875 the proprietor of an experimental farm near Santa Rosa, Cal. By means of artificial selection he has bred numerous useful varieties of food plant, including a thornless cactus and a white blackberry.

**BURCHARD**, Samuel Dickinson, an American Presbyterian clergyman, born in New York in 1812, died in 1891. He preached to New York City. Burchard is famous chiefly for his speech in 1884 during the Blaine-Cleveland campaign, in which he denounced the democratic party as the party of Rum, Romanism, and Rebellion. The speech, it is believed, defeated Blaine, notwithstanding his favor with many Roman Catholics.

**BURDEN**, Henry, an American inventor, born in Scotland in 1791, died in 1871. His principal inventions, are improvements in the plow, a railroad spike making machine, and a horseshoe making machine. He was the owner of the Troy Iron and Nail Works.

**BURDEN OF PROOF**, the obligation resting on the affirmant of a proposition to prove the truth of his affirmation. In criminal cases the burden of proof rests with the state.

**BURDETT**, Sir Francis, English politician, born 1770, died 1844. In 1796 he entered parliament as member for Boroughbridge, and advocated parliamentary reform and various liberal measures. He afterward sat for Middlesex, and in 1807-37 for Westminster. In his later years he became a Tory, and represented North Wilts. In 1793 he married the youngest daughter of Thomas Coutts the banker.

**BURDETT-COUTTS** (kōts), Angela Georgina, daughter of the above, born 1814, has become deservedly popular for the liberal use she has made of the immense wealth she inherited from her grandfather (Thomas Coutts) in public and private charities. In 1871 she received a peerage from government; and in 1881 married a Mr. Ashmead-Bartlett who has assumed the name of Burdett-Coutts. She died in 1906.

**BUREAU** (bū-rō'), a writing-table, also the chamber of an officer of government and the body of subordinate officers who labor under the direction of a chief.—Bureau system, or bureaucracy, is a term often applied to those governments in which the business of administration is carried on in departments, each under the control of a chief; or, more broadly, the system of centralizing the administration of a country through regularly graded series of government officials.

**BURGESS**, Edward, an American naval architect, born in 1848, died in 1891. He is noted for his designs of racing yachts, including the Puritan, the Mayflower, and the Volunteer, which were successful defenders of

the America's cup in 1885, 1886, and 1887.

**BURGESS**, Frank Gelett, an American humorist, born in 1866, in Boston. He originated in 1895 a fantastical weekly called *The Lark*, which was published with poor success at San Francisco. His drawings are quaint and most pleasing.

**BURGESS**, Neil, an American actor, born in Boston in 1846. His principal rôles have been those of Josiah Allen's Wife, and the Widow Bedott, female characters in which the actor evinced a quaint and fetching humor which has made him exceedingly popular.

**BURGLARY** is defined in English law to be a breaking and entering the dwelling-house of another, in the night, with intent to commit some felony within the same, whether such felonious intent be executed or not. In the U. States the crime of burglary has been defined in many states by statutes in which the meaning of the term has been considerably widened so as to include the breaking into any building at any time with the intention of committing a crime.

**BUR'GOMASTER**, the chief magistrate of a municipal town in the Netherlands and Germany. The title is equivalent to the English mayor and the Scotch provost.

**BURGOS** (bur'gos), a city of northern Spain, once the capital of the kingdom of Old Castile, and now the chief town of the province of Burgos. The cathedral, commenced in 1221, is one of the



The Cathedral of Burgos.

finest examples of Gothic architecture in Spain. It contains the tombs of the famous Cid, and of Don Fernando, both natives of Burgos, and celebrated throughout Spain for their heroic achievements in the wars with the Moors. Before the removal of the court to Madrid, in the 16th century, Burgos was in a very flourishing condition, and contained thrice its present population. It has some manufactures in woollens and linens. Pop. 29,683.—The province has an area of 5650 sq. miles, largely hilly or mountainous, but with good agricultural and pastoral land. Pop. 348,152.

**BURGOYNE** (bur-goin'), John, an English general officer and dramatist; born 1722, died 1792. After serving in various parts of the world, he was in 1777 appointed commander of an army against the revolted Americans, and took Ticonderoga, but had at last to surrender with his whole army at Saratoga. He was ill received on his return to England, and deprived of his command of the 76th Light Dragoons and the governorship of Fort William.

**BURGUNDY**, a region of western Europe, so named from the Burgun-

## BURGUNDY

dians, a Teutonic or Germanic people originally from the country between the Oder and the Vistula. They migrated first to the region of the Upper Rhine, and in the beginning of the 5th century



General Burgoyne.

passed into Gaul and obtained possession of the southeastern part of this country, where they founded a kingdom having its seat of government sometimes at Lyons, and sometimes at Geneva. They were at last wholly subdued by the Franks. In 879 Boson, Count of Autun, succeeded in establishing the royal dignity again in part of this kingdom. He styled himself King of Provence, and had his residence at Arles. His son Louis added the country beyond the Jura, and thus established Cis-Juran Burgundy. A second kingdom arose when Rudolph of Stettlingen formed Upper or Transjuran Burgundy out of part of Switzerland and Savoy. Both these Burgundian kingdoms were united, and finally, on the extinction of Rudolph's line, were incorporated with Germany. But a third state, the historical Duchy of Burgundy, consisting principally of the French province of Bourgogne or Burgundy, had been formed as a great feudal and almost independent province of France in the 9th century. This first ducal line died out with a Duke Philip, and the duchy, reverting to the crown, was, in 1363, granted by King John of France to his son Philip the Bold, who thus became the founder of a new line of dukes of Burgundy. A marriage with Margaret, daughter of Louis III., count of Flanders, brought him Flanders, Mechlin, Antwerp, and Franche-Comté. He was succeeded by his son Duke John the Fearless, whose son and successor, Philip the Good, so greatly extended his dominions, that on his death in 1467 his son Charles, surnamed the Bold, though possessing only the title of duke, was in reality one of the richest and most powerful sovereigns of Europe. (See Charles the Bold.) Charles left a daughter, Mary of Burgundy, the sole heiress of his states, who by her marriage to Maximilian of Austria transferred a large part of her dominions to that prince, while Louis XI. of France acquired Burgundy proper as a male fief of France. Burgundy then formed a province, and is now represented by the four departments of Yonne, Côte-d'Or, Saône-et-Loire, and Ain. It is watered by a number of navigable rivers, and is one of the most productive provinces in France, especially of wines.



**BURGUNDY PITCH**, a resin got from the Norway spruce and several other pines. It is used in medicine as a stimulating plaster. It takes its name from Burgundy in France, where it was first prepared.

**BURGUNDY WINES** are produced in the former province of Burgundy, especially in the department of Côte-d'Or, and in richness of flavor and all the more delicate qualities of the juice of the grape they are inferior to none in the world. Among the red wines of Burgundy the finest are the Chambertin, the Clos Vougeot, Romanée-Conty, etc.

**BURIAL** (be'-ri-al), the mode of disposing of the dead, a practice which varies among different peoples. Among savage races, and even among some cultured peoples of the East, exposure to wild animals or birds of prey is not uncommon. The careful embalment of their dead by the ancient Egyptians may be regarded as a special form of burial. But by far the most common forms of disposing of the dead have been burning and interring. Among the Greeks and Romans both forms were practiced, though among the latter burning became common only in the later times of the republic. In this form of burial the corpse, after being borne in procession through the streets, was placed upon a pyre built of wood, and profusely sprinkled with oils and perfumes. Fire was set to the wood, and after the process of cremation was complete the bones and ashes were carefully gathered together by the relatives and placed in an urn. With the introduction of the Christian religion, consecrated places were appropriated for the purpose of general burial, and the Roman custom of providing the sepulcher with a stone and inscription was continued by the Christians. The practice of cremation now declined and finally disappeared, but has recently to some little extent been revived.

**BU'RIATS**, a nomadic Tartar people allied to the Kalmucks, inhabiting the southern part of the government of Irkutsk and Transbaikalia. Their number is about 200,000. They live in huts called yurts, which in summer are covered with leather, in winter with felt. They support themselves by their flocks, by hunting, and the mechanical arts, particularly the forging of iron.

**BURKE**, Edmund, a writer, orator, and statesman of great eminence, was born in Dublin, Jan. 1, 1730. The political career for which he had been arduously preparing himself all along at length opened up to him on his appointment as private secretary to Mr. W. G. Hamilton, Secretary for Ireland, in 1761. On his return he obtained the appointment of private secretary to the Marquis of Rockingham, then First Lord of the Treasury. Through the same interest he entered parliament as member for Wendover (1765). The great question of the right of taxing the American colonies was then occupying parliament, and the Rockingham ministry having taken, mainly through Burke's advice, a middle and undecided course, was soon dissolved (1766). From 1770 to 1782 Lord North was in power, and Burke held no office. In 1774-80

he was member for Bristol. In several magnificent speeches he criticized the ministerial measures with regard to the colonies, and advocated a policy of justice and conciliation. In 1782, when the Rockingham party returned to power, Burke obtained the lucrative post of paymaster-general of the forces, and shortly after introduced his famous



Edmund Burke.

bill for economical reform, which passed after considerable modifications had been made on it. On the fall of the Duke of Portland's coalition ministry, 1783, of which Burke had also been part, Pitt again succeeded to power, and it was during this administration that the impeachment of Hastings, in which Burke was the prime mover, took place. The lucidity, eloquence, and mastery of detail which Burke showed on this occasion have never been surpassed. The chief feature in the latter part of Burke's life was his resolute struggle against the ideas and doctrines of the French revolution. His attitude on this question separated him from his old friend Fox, and the Liberals who followed Fox. His famous *Reflections on the Revolution in France*, a pamphlet which appeared in 1790, had an unprecedented sale, and gave enormous impetus to the reaction which had commenced in England. From this time most of his writings are powerful pleadings on the same side. In 1794 he withdrew from parliament. Three years after, on July 8, 1797, he died, his end being hastened by grief for the loss of his only son.

**BURLEIGH**, Lord. See Cecil.

**BURLESQUE** (bur-lesk') signifies a low form of the comic, arising generally from a ludicrous mixture of things high and low. High thoughts, for instance, are clothed in low expressions, noble subjects described in a familiar manner, or vice versa. The true comic shows us an instructive, if laughable, side of things; the burlesque travesties and caricatures them in order to excite laughter or ridicule.

**BURLET'TA**, a light, comic species of musical drama, which derives its name from the Italian burlare, to jest. It originated in Italy, from whence it passed to the Transalpine countries.

**BURLINGTON**, city, important railroad center, and river-port of Iowa; capital of Des Moines co.; situated on the Mississippi river; 207 miles w.s.w. of Chicago, 250 miles by water above St.

Louis, and 296 miles by railroad east of Omaha. The river is here a broad, deep, and beautiful stream. The plan of the city is regular, and the houses are mostly of brick and stone. This place is the seat of Burlington University, and contains about twenty-five churches and numerous manufactories. Pop. 27,400.

**BURLINGTON**, city, and railroad center, of Burlington co., N. J., on the Delaware river, 20 miles above Philadelphia and 12 miles s.w. of Trenton. The principal industries are the manufacture of shoes, canned goods, iron pipes of all sizes, stoves, heaters, and carriages. Pop. 10,100.

**BURLINGTON**, city and railroad center and county-seat of Chittenden co., Vt., on Burlington Bay of Lake Champlain; 40 miles w. from Montpelier, the capital of the state.

The heaviest trade in the city is in lumber. There are large quarries of building-stone, of limestone, and of fine marble within or near the city limits; large cotton-mills, steam marble-mills, machine-shops, foundries, sash, chair, furniture, patent medicine, malt cereals, and shoe factories, paper-mills, and many smaller manufacturing trades are thriving.

The University of Vermont and State Agricultural College is situated here. Pop. 20,140.

**BURLINGTON LIMESTONE**, a formation of the carboniferous period, occurring in Missouri and Illinois, adjacent to the Mississippi river. It affords a valuable building-stone, and is peculiarly interesting to naturalists. The upper bed is of a light-gray color, and is nearly pure carbonate of lime. The lower bed contains more magnesia.

**BUR'MAH**, a country of southern Asia, bounded on the north by Assam and Tibet, on the east by Chinese territory and Siam, elsewhere mainly by the Bay of Bengal; area about 290,000 sq. miles. It is traversed by great mountain ranges branching off from those of northern India and running parallel to each other southward to the sea. Between these ranges and in the plains or valleys here situated the four great rivers of Burmah—the Irrawaddy, its tributary the Kyen-dwen, the Sittang, and the Salwen—flow in a southerly direction to the sea, watering the rich alluvial tracts of Lower Burmah, and having at their mouths all the great seaports of the country—Rangoon, Bassein, Moulmein, Akyab, etc. The Irrawaddy is of great value as a highway of communication and traffic, being navigable beyond Bhamo, near the Chinese frontier, or over 800 miles. In their lower courses the rivers often overflow their banks in the rainy season. Though its resources are almost entirely undeveloped, the country, as a whole, is productive, especially in the lower portions. Here grow rice, sugar-cane, tobacco, cotton, indigo, etc. Cotton is grown almost everywhere; tea is cultivated in many of the more elevated parts. The forests produce timber of many sorts, including teak, which grows most luxuriantly, and is largely exported. Iron-wood is another valuable timber; and among forest products are also the bamboo, cutch, stick-lac, and



rubber. Burmah has great mineral wealth—gold, silver, precious stones, iron, marble, lead, tin, coal, petroleum, etc.; but these resources have not yet been much developed. The chief precious stone is the ruby, and the mines of this gem belong to the crown. Sapphire, amber, and jade are also obtained. Among wild animals are the elephant, rhinoceros, tiger, leopard, deer of various kinds, and the wild hog. Among domestic animals are the ox, buffalo, horse, and elephant. The rivers abound with fish. The most common fruits are the guava, custard-apple, tamarind, pine, orange, banana, jack, and mango. The yam and sweet-potato are cultivated, and in some parts the common potato. The climate of course varies according to elevation and other circumstances, but as a whole is warm, though not unhealthful, except in low jungly districts. The rainfall among the mountains reaches as high as 190 inches per annum.

The population may be stated at about 9,000,000 or 10,000,000, made up of a great variety of races besides the Burmese proper, as Talaings, Shans, Karens, etc. The Burmese proper are of a brown color, with lank, black hair (seldom any on the face), and have active, vigorous, well-proportioned frames. They are a cheerful, lively people, fond of amusement, averse to continuous exertion, free from prejudice of caste or creed, temperate and hardy. The predominant religion is Buddhism. The Burmese language is monosyllabic, like Chinese, and is written with an alphabet the characters of which (derived from India) are more or less circular. There is a considerable literature.

Burmah is now divided into Lower Burmah and Upper Burmah, the former till 1886 being called British Burmah, while the latter till that date was an independent kingdom or empire. Lower Burmah was acquired from Independent Burmah in 1826 and 1852 as the result of two wars terminating in favor of Britain. It comprises the divisions of Aracan, Pegu, Irrawaddy, and Tenasserim; area, 87,957 sq. miles; population 5,371,328. Under British rule it has prospered greatly, the population and trade having increased immensely. Roads, canals, railways, and other public works have been carried out. The area of Upper Burmah under direct British administration is 83,473 sq. miles; pop. 3,849,833. The chief city and port is Rangoon, which is now connected by railway with Mandalay in Upper Burmah.

Under its native kings the form of government in Upper Burmah was absolute monarchy, the seat of government being latterly at Mandalay. The king was assisted in governing by a council of state known as the Hloot-daw, to which belonged the functions of a house of legislature, a cabinet, and a supreme court. The king had power to punish at his pleasure any one, even the great officers of state. The revenue was derived from taxes levied in a very irregular and capricious manner, and official corruption was rampant. The criminal laws were barbarously severe. Capital punishment was commonly

inflicted by decapitation, but crucifixion and disemboweling were also practiced. After the loss of the maritime provinces the influence of Independent Burmah greatly declined, as did also its Asiatic and foreign trade.

The Burmese empire is of little note in ancient or general history. Upper Burmah was annexed to the British empire by proclamation of the Viceroy of India, 1st Jan. 1886. The area thus annexed was about 200,000 sq. miles, of which half belonged to the kingdom proper, half to the semi-independent Shan states. Its government is now organized under a single lieutenant-governor, Upper and Lower Burmah forming each a commissionership, and being divided into four divisions each, which again are subdivided into districts.

**BURNABY**, Frederick Gustavus, English soldier and traveler, born 1842. In 1875 he made his famous ride to Khiva. In 1876 he rode through Asiatic Turkey and Persia. Of both these journeys he published narratives. In 1885 (Jan. 17), while serving as lieutenant-colonel of the Royal Horse Guards in the Egyptian campaign, he was slain at the battle of Abu-Klea.

**BURNETT**, Frances Eliza Hodgson, an Anglo-American novelist, born in England in 1849 and identified with American literature since 1872. Her most popular works are *That Lass o' Lowrie's*, *A Lady of Quality*, *Little Lord Fauntleroy*, and *Through One Administration*. In 1873 she married Dr. S. M. Burnett. She lives in Europe and in Washington.

**BURNING-GLASS**, a lens which, by bringing the sun's rays rapidly to a focus, produces a heat strong enough to kindle combustible matter. The lenses commonly used are convex on both sides, and have a small focal distance. That such a glass may produce its greatest effect it is necessary that the rays of the sun should fall upon it in a perpendicular direction. The effect may be greatly augmented by the use of a second lens, of a smaller focal distance, placed between the first and its focus. Some immense burning-glasses have been made, producing surprising effects. Concave burning-mirrors produce the same kind of results, and have almost four times more power than burning-glasses of equal extent and curvature. The concavity must present a surface of high reflecting power (polished silver or other metal, or silvered glass), and must be either spherical or parabolic. Plane mirrors may also be employed like concave ones, if several of them are combined in a proper manner. The ancients were acquainted with such mirrors, and Archimedes is said to have set the Roman fleet on fire at the siege of Syracuse (B.C. 212) by some such means. In 1747 Buffon by a combination of mirrors burned wood at the distance of 200 feet and melted tin at the distance of 150, etc.

**BURNING-MIRRORS**. See preceding article.

**BURNISHER**, a blunt, smooth tool, used for smoothing and polishing a rough surface by rubbing. Agates, tempered steel, and dog's teeth are used for burnishing.

**BURN'LEY**, a parl., municipal, and county borough of England, in Lan-

cashire, about 22 miles n. of Manchester. Pop. 97,044.

**BURNS**, Robert, the great lyric poet of Scotland, was born near Ayr, January 25, 1759. He was instructed in the ordinary branches of an English education; to these he afterward added French and a little mathematics. But



Robert Burns.

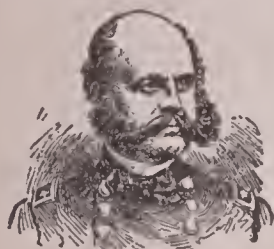
most of his education was got from the general reading of books, to which he gave himself with passion. In this manner he learned what the best English poets might teach him, and cultivated the instincts for poetry which had been implanted in his nature. He began to produce poetical pieces which attracted the notice of his neighbors and gained him considerable reputation. In 1786 Burns was about to set sail for Jamaica, when he was drawn to Edinburgh by a letter from Dr. Blacklock to an Ayrshire friend of his and the poet, recommending that he should take advantage of the general admiration his poems had excited, and publish a new edition of them. This advice was eagerly adopted, and the result exceeded his most sanguine expectations. After remaining more than a year in the Scottish metropolis, admired, flattered, and caressed by persons of eminence for their rank, fortune, or talents, he retired to the country with the sum of some \$2500, which he had realized by the second publication of his poems. A part of this sum he advanced to his brother, and with the remainder took a considerable farm (Ellisland) near Dumfries, to which he subsequently added the office of exciseman. He now married Jean Armour, a Mauchline girl. But the farming at Ellisland was not a success, and in about three years Burns removed to Dumfries and relied on his employment as an exciseman alone. He continued to exercise his pen, particularly in the composition of a number of beautiful songs adapted to old Scottish tunes. In the winter of 1795 his constitution, broken by cares, irregularities, and passions, fell into premature decline; and in July, 1796, a rheumatic fever terminated his life and sufferings at the early age of thirty-seven.

**BURNS AND SCALDS** are injuries produced by the application of excessive heat to the human body. They are generally dangerous in proportion to the extent of surface they cover, and a wide-spread scald may cause serious consequences on account of the nervous shock. Congestion of the brain, pneu-



monia, inflammation of the bowels, or lock-jaw may result from an extensive burn. Hence the treatment requires to be both local and constitutional. If there is shivering or exhaustion hot brandy and water may be given with good effect, and if there is much pain a sedative solution of opium. The local treatment consists in dredging the burn with fine wheat flour, and then wrapping it up in cotton-wool. An application of equal quantities of olive-oil and lime-water, called carron-oil, is much recommended by some, the part being afterward covered by cotton-wool. The main thing is to keep the air from the injured part, and therefore, when a blister forms, although it may be pricked, the loose skin should not be removed.

**BURNSIDE**, Ambrose Everett, an American soldier, born in Indiana in 1824, died in 1881. He began his military career as a colonel of Rhode Island volunteers in the civil war and took part



A. E. Burnside.

in the battles of Antietam, Fredericksburg, and other engagements. He tried to suppress several newspapers in the North, but his orders were overruled by popular pressure. He was raised to the rank of major-general of volunteers, and toward the end of the war he served under Grant in the Richmond campaign. Burnside subsequently to the war served in the senate of the U. States.

**BURNT-OFFERING**, something offered and burnt on an altar as an atonement for sin; a sacrifice. The burnt-offerings of the Jews were either some clean animal, as an ox, a sheep, a pigeon; or some species of vegetable substance, as bread, flour, ears of wheat or barley.

**BURR**, Aaron, third vice-president of the U. States, born in New Jersey in 1756. After serving with honor in the revolutionary army he became a lawyer, and finally leader of the democratic party and vice-president in 1801. His duel with Alexander Hamilton, which ended fatally for the latter, drove him from New York to settle farther west, where he conceived an audacious and grandiose scheme of founding an empire in the s.w. He was tried for treason, and, though acquitted, sank into obscurity. He died in 1836.

**BURRITT**, Elihu, the "learned blacksmith," as he was called, was born at New Britain, Conn., Dec. 8, 1810. He was apprenticed to a blacksmith, but, conceiving a strong desire for knowledge, he began to read English literature, and with great diligence and perseverance at length acquired proficiency not only in the ancient, but also most of the modern languages of Europe. In 1848 the first International Peace Congress was held under his guidance at Brussels. In 1865 he was consular

agent at Birmingham. In 1868 he returned to live on his farm in America, and died March 7, 1879. His best-



*John Burroughs*

known writings are Sparks from the Anvil; Thoughts and Things at Home and Abroad; Chips from Many Blocks; etc.

**BURROUGHS**, John, an American naturalist and writer, born at Roxbury, N. Y., in 1837. His chief works are concerned with descriptions of animals and plants, but he has also written a considerable number of essays and



*John Burroughs*

criticisms. Among his more popular books are Wake, Robin; Winter Sunshine; Birds and Poets; Locusts and Wild Honey; Fresh Fields; Signs and Seasons; Indoor Studies; and Squirrels and Other Fur-Bearers.

**BURROUGHS**, Marie, an American actress, born at San Francisco in 1866. She made her debut in New York in The Rajah, and subsequently appeared with E. S. Willard in The Middleman, Judah and Ophelia, and other plays. She married Robert Barclay MacPherson in 1901.

**BURROWING-OWL**, an American owl which dwells in holes in the ground

either made by itself or by some other animal, as the prairie-dog or marmot. It feeds on insects and seeks its food by day.

**BURTON**, John Hill, historian of Scotland, born at Aberdeen 1809, died near Edinburgh 1881. His first book was the Life and Correspondence of David Hume (1846), followed by Lives of Lord Lovat and Duncan Forbes of Culloden, and other works. His chief work was his History of Scotland from the Earliest Times to 1746. He was appointed secretary to the Scottish Prison Board in 1854, and was connected with this department till his death.

**BURTON**, Sir Richard Francis, K.C. M.G., English traveler and linguist, born in 1821. In 1853 he went to Arabia and visited Mecca and Medina disguised as a Mohammedan pilgrim—a sufficiently dangerous journey. He visited many countries and published many works, and translations of Camões's Lusiads and of the Arabian Nights, etc. Died 1890.

**BURTON**, Robert, an English writer, born at Lindley in Leicestershire in 1576. His vast out-of-the-way learning is curiously displayed in his book The Anatomy of Melancholy, which he published in 1621. Burton died in 1640.

**BURTON-UPON-TRENT**, a county borough of England, in Staffordshire. It is chiefly celebrated for its excellent ale, for which there are numerous breweries, employing upward of 5000 men and boys. Pop. 50,386.

**BURY** (be'ri), a municipal, county, and parl. borough of England, in Lancashire, 8 miles n.n.w. of Manchester. Sir Robert Peel was born near Bury in 1788, and a bronze statue of him adorns the town. Pop. 58,028.

**BURYING-BEETLE**, the name of a genus of insects. They have a very keen scent, which guides them to the dead bodies of rats, mice, etc., which form their food. Several beetles will unite to cover such animals, burying them sometimes more than 6 inches in the earth. They deposit their eggs on the carrion, and in less than a fortnight the larvæ issue. The species are common everywhere.

**BUSBY** (buz'bi), a military head-dress worn by hussars, artillerymen, and engineers, consisting of a fur hat with a bag, of the same color as the facings of the regiment, hanging from the top over the right side. The bag appears to be a relic of a Hungarian head-dress from which a long padded bag hung over, and was attached to the right shoulder as a defense against sword-cuts.

**BUSHEL**, an English dry measure, containing 8 gallons or 4 pecks.

**BUSHMEN**, a race of people who dwell in the western part of South Africa, in the immense plains bordering on the n. side of the colony of the Cape of Good Hope. They are the most degraded of the races who inhabit this part of the country. Their language is exceedingly poor, consisting only of a certain clicking with the tongue and harsh gurgling tones, for which we have no letters.

**BUSH-RANGERS**, the name for desperadoes in Australia who, taking to the bush, have supported themselves by levying contributions on the prop-



erty of all and sundry within their reach.

**BUSINESS COLLEGES**, the name in America for the higher-class institutions specially intended to give a practical training in all subjects belonging to commerce.

**BUSINESS HOURS**, the hours of the day in which business is ordinarily done. In the U. States from 8 a. m. till 6 p. m. is the usual business day. In American banks business hours are from 10 a. m. to 3 p. m. No payment is made nor deposit received except in these hours. Bills cannot be collected nor payment legally tendered except during business hours.

**BUST**, in sculpture, the representation of that portion of the human figure which comprises the head and the upper part of the body. During the literary period of Greece the portrait busts of the learned formed an important branch of art, and in this way we come to possess faithful likenesses of Socrates, Plato, Demosthenes, etc., in which the artists showed great power of expressing the character of those represented. The number of busts belonging to the time of the Roman Empire is very considerable, but those of the Roman poets and men of letters have not been preserved in nearly so large numbers as those of the Greeks. The first bust that can be depended upon as giving a correct likeness is that of Scipio Africanus the elder.

**BUSTARD**, a bird belonging to the order Cursores, or runners, but approaching the waders. The great bustard is the largest European bird, the male often weighing 30 lbs., with a



Great bustard.

breadth of wing of 6 or 7 feet. The bustard is now rare in Britain, but abounds in the south and east of Europe and the steppes of Tartary, feeding on green corn and other vegetables, and on earth-worms. Its flesh is esteemed. All the species run fast, and take flight with difficulty.

**BUTLER**, Alban, English Roman Catholic writer, born 1711, died 1773. His *Lives of the Saints* is a monument of erudition which cost him thirty years' labor.

**BUTLER**, Benjamin Franklin, an American politician and lawyer, born in New York in 1795, died 1858. He was Martin Van Buren's partner until 1821, revised the New York statutes, was attorney-general in Jackson's cabinet, and secretary of war in Polk's cabinet. He was an ardent democrat.

**BUTLER**, Benjamin Franklin, an American soldier, politician, and governor, born in Deerfield, N. H., in 1818, died in 1893. He was candidate for governor of Massachusetts in 1860, and at the opening of the civil war was made major-general of volunteers. Butler

from the first was an uncompromising enemy of slave-owners, and his occupation of New Orleans from 1862 to 1863 has been criticized severely. His chief offense was his general order that women insulting officers should be treated as women of the town. Jefferson Davis issued a proclamation that Butler was an outlaw, and if captured should be at once hanged. Subsequently to the war Butler was very prominent in politics, and in 1880 was elected governor of Massachusetts. In 1884 he was candidate for president on the greenback-labor ticket. He died at Washington.

**BUTLER**, Joseph, an English prelate and celebrated writer on ethics and theology, born in Berkshire in 1692. The sermons which he delivered as preacher at the Rolls Chapel, an appointment he occupied in 1718-26, still hold a high place in ethical literature. But his great work is the *Analogy of Religion, Natural and Revealed, to the Constitution and Course of Nature*, which was published in 1736, and acquired for him a great reputation. In 1738 he was made Bishop of Bristol, and in 1750 promoted to the see of Durham. He died in 1752.

**BUTLER**, Nicholas Murray, an American educator, born in New Jersey in 1862, educated in American and European universities, and in 1887 organized the New York College for the Training of Teachers. He founded the *Educational Review* in 1891, and since 1901 has been president of Columbia University.

**BUTLER**, Samuel, English satirical poet. Butler published the first part of *Hudibras* after the Restoration, in 1663. It became immensely popular, and Charles II. himself was perpetually



Samuel Butler.

quoting the poem, but did nothing for the author, who seems to have passed the latter part of his life dependent on the support of friends, and died in poverty in London in 1680. A second part of *Hudibras* appeared in 1664, a third in 1678. The poem is a sort of burlesque epic ridiculing Puritanism, and fanaticism and hypocrisy generally. Butler was author also of various other pieces, including a satire on the Royal Society entitled the *Elephant in the Moon*.

**BUTTE**, a city and county seat of Silverbow Co., Mont., on the western slope of a range of the Rocky Mountains, and on the Oregon Short Line, the

Northern Pacific, the Great Northern, and the Montana Union railroads. The famous Anaconda Copper and Silver Mine is located here, and within a few miles are many other productive gold, silver, and copper deposits, the industries of the city centering almost entirely in the mines. In copper, the production of Butte is placed at about one-half of the entire output of the United States, and the amount of gold and silver mined is also considerable, the value of the annual production of these three minerals being estimated at nearly \$50,000,000. Besides the mines, there are immense mills and smelting-works. Pop. 33,125.

**BUTTER**, a fatty substance produced from milk, especially cows' milk. When the milk is first drawn this fatty matter is disseminated through it in minute clear globules inclosed in membranous sacs or bags which in a short time rise to the surface and form cream. The cream is then skimmed off to undergo the operation of churning, which by rupturing the sacs effects a separation of the cream into a solid called butter and a liquid called buttermilk, the latter consisting of whey and other caseous matter. The quality of the butter depends much upon the treatment of the cream at this stage. Its temperature in warm weather ought to be between 53° and 55°; in colder weather several degrees higher. If too cold the fat is hard and does not coalesce, and if too warm it becomes semi-liquid. The butter, being formed into lumps, is washed well in cold water, and kneaded till all the buttermilk has been expelled. Butter of good quality has a faint sweet odor and a soft delicate flavor. Its composition varies somewhat according to the way in which it is made. It has usually from 80 to 90 per cent of pure fat, the rest consisting of casein, water, and salt. The water should not amount to more than 10 per cent, nor the salt to more than 2 per cent of the whole weight, but butter is frequently adulterated by the excess of these two elements. Butter which is to be thoroughly "cured," so as to keep for some length of time, is usually prepared with from 5 to 8 per cent of common salt.

**BUTTERCUP**, the popular name of two or three species of plants with brilliant yellow-flowers.

**BUTTERFLY**, the common name of all diurnal lepidopterous insects. One of the most remarkable and interesting circumstances connected with these beautiful insects is their series of transformations before reaching a perfect state. The female butterfly lays a great quantity of eggs, which produce larvæ commonly called caterpillars. After a short life these assume a new form, and become chrysalids or pupæ. These chrysalids are attached to other bodies in various ways, and are of various forms; they often have brilliant golden or argentine spots. Within its covering the insect develops, to emerge as the active and brilliant butterfly. These insects in their perfect form suck the nectar of plants, but take little food, and are all believed to be short-lived, their work in the perfect state being almost confined to the propagation of



the species. Butterflies vary greatly in size and coloring, but most of them are very beautiful. The largest are found in tropical countries, where some measure nearly a foot across the wings. They may generally be distinguished from moths by having their wings erect when sitting, the moths having theirs



1, 2, Chrysalis of the white butterfly-moth; *a*, Palpi or feelers; *bb*, wing-cases; *c*, sucker; *ee*, eyes; *xx*, antennæ. 3, Chrysalis of the oak eifer-moth.

horizontal. Some of them have great powers of flight. Among the most remarkable butterflies are those that present an extraordinary likeness to other objects—leaves, green or withered, flowers, bark, etc.—a feature that serves greatly to protect them from enemies. See *Lepidoptera* and *Mimicry*.

**BUTTERINE**, a mixture of several kinds of fats, worked together, churned in milk, colored, and sold as a substitute for butter. Its manufacture is permitted by U. States law, but it must not be sold as butter, but must be marked plainly "butterine." Some states forbid the coloring of it, and dealers supply coloring matter to the buyer, who may thus evade the law in dealing with his consumers. Butterine now is generally made of deoderized lard mixed with cottonseed stearine and a little genuine butter, and churned with milk. It was formerly made of "oleo oil," that is, the fat expressed from beef tallow, which was mixed and churned as above. Butterine is not an unhealthful article of diet when properly and carefully manufactured.

**BUTTERMILK**, the milk from which butter has been extracted, forming a nutritious and agreeable cooling beverage with an acidulous taste.

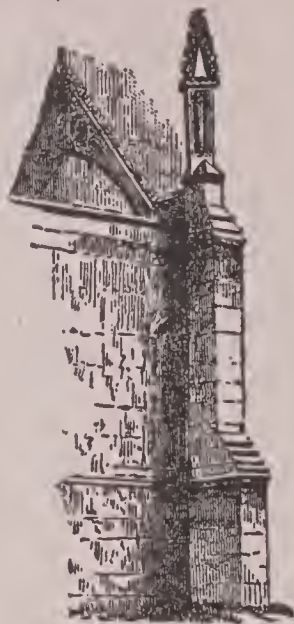
**BUTTERNUT**, the fruit of an American tree, so called from the oil it contains. The tree bears a resemblance in its general appearance to the black walnut, but the wood is not so dark in color.

**BUTTONS** are of almost all forms and materials—wood, horn, bone, ivory, steel, copper, silver, brass, etc.—which are either left naked or covered with silk or some other material. A substance now very commonly used for buttons is vegetable ivory (seeds of the ivory-nut palm), which may be colored according to taste. Mother-of-pearl buttons are another common kind.

**BUTTRESSES**, in architecture, especially Gothic, projections on the outside of the walls of an edifice, extending from the bottom to the top, or nearly, and intended to give additional support to the walls and prevent them from spreading under the weight of the roof. Flying buttresses, of a somewhat arched form, often spring from the top of the ordinary buttresses, leaning inward so as to abut against and support a higher portion of

the building, such as the wall of a clear-story, thus receiving part of the pressure from the weight of the roof of the central pile.

**BUTYRIC ACID**, an acid obtained from butter; it also occurs in perspira-



Buttress and flying buttress.

tion, cod-liver oil, etc. Butyric acid is a colorless liquid, having a smell like that of rancid butter; its taste is acrid and biting, with a sweetish after-taste.

**BUZ'ZARD**, the name of raptorial birds which form one of the sub-families of the diurnal birds of prey; characters, a moderate-sized beak, hooked from the base, long wings, long tarsi, and short weak toes. The common buzzard is distributed over the whole of Europe as well as the north of Africa and America. Its food is very miscellaneous, and consists of moles, mice, frogs, toads, worms, insects, etc. It is sluggish in its habits. Its length is from 20 to 22 inches. The rough-legged buzzard, so called from having its legs feathered to the toes, is also a native of Britain. Its habits resemble those of the common buzzard. The red-tailed hawk of the U. States is a buzzard. It is also called hen-hawk, from its raids on the poultry-yard.

**BY-LAW**, a law made by an incorporated or other body for the regulation of its own affairs, or the affairs intrusted to its care. By-laws must of course be within the meaning of the charter of incorporation and in accordance with the law of the land.

**BYRON**, George Gordon Noel, Lord Byron, a great English poet, was born in Holles street, London, Jan. 22, 1788. In 1805 he was entered of Trinity College, Cambridge. Two years after, in 1807, appeared his first poetic volume, *Hours of Idleness*, which, though indeed containing nothing of much merit, was castigated with overseverity by Brougham in the *Edinburgh Review*. This caustic critic roused the slumbering energy in Byron, and drew from him his first really notable effort, the celebrated satire *English Bards and Scotch Reviewers*. In 1809, in company with a friend, he visited the southern provinces of Spain, and voyaged along the shores

of the Mediterranean. The fruit of these travels was the fine poem of *Childe Harold's Pilgrimage*, the first two cantos of which were published on his return in 1812. The poem was an immense success, and Byron "awoke one morning and found himself famous." During the next two years (1813-14) the *Giaour*, the *Bride of Abydos*, the *Corsair*, *Lara*, and the *Siege of Corinth* showed the brilliant work of which the new poet was capable. On the 2d of January, 1815, Byron married Anna Isabella, only daughter of Sir Ralph Milkanke, but the marriage turned out unfortunate, and in about a year Lady Byron, having gone on a visit to her parents, refused to return, and a formal separation took place. He visited France, the field of Waterloo and Brussels, the Rhine, Switzerland, and the north of Italy, and for some time took up his abode at Venice, and latterly at Rome, where he completed his third canto of *Childe Harold*. Not long after appeared the *Prisoner of Chillon*, *The Dream*, and other poems; and in 1817 *Manfred*, a tragedy, and the *Lament of Tasso*. From Italy he made occasional excursions to the islands of Greece, and at length visited Athens, where he sketched many of the scenes of the fourth and last canto of *Childe Harold*. In 1819 was published the romantic tale of *Mazeppa*, and the same year was marked by the commencement of *Don Juan*. In 1820 appeared *Marino Faliero*, Doge of Venice, a tragedy; the drama of *Sardanapalus*; the *Two Foscari*, a



Lord Byron.

tragedy; and *Cain*, a mystery. After leaving Venice Byron resided for some time at Ravenna, then at Pisa, and lastly at Genoa. There he continued to occupy himself with literature and poetry, sustained for a time by the companionship of Shelley, one of the few men whom he entirely respected and with whom he was quite confidential. Besides his contributions to the *Liberal*, a periodical established at this time in conjunction with Leigh Hunt and Shelley, he completed the later cantos of *Don Juan*, with *Werner*, a tragedy, and the *Deformed Transformed*, a fragment. These are the last of Byron's poetical efforts. In 1823 he conceived the idea of throwing himself into the struggle for the independence of Greece. In January, 1824, he arrived at Missolonghi, was received with the greatest enthusiasm, and immediately took into his pay a body of 500 Suliotes. On the 9th of

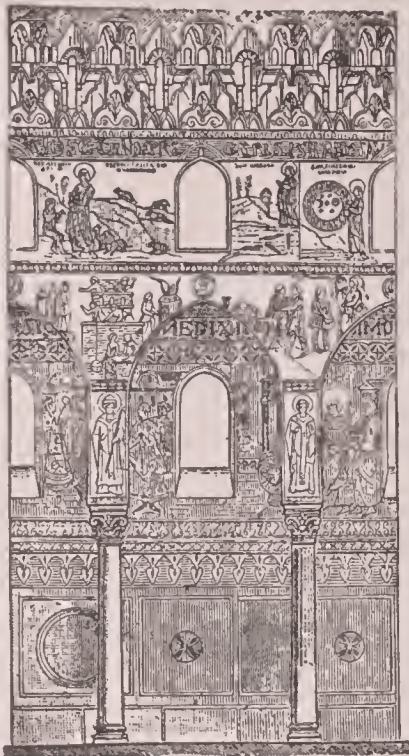


April, 1824, while riding out in the rain, he caught a fever, which ten days later ended fatally. Thus, in his thirty-seventh year, died prematurely a man whose natural force and genius were perhaps superior to those of any Englishman of his time. The body of Byron was brought to England and interred near Newstead Abbey.

**BYZANTINE ART**, a style which arose in southeastern Europe after Constantine the Great had made Byzantium the capital of the Roman Empire (330 A.D.), and ornamented that city, which was called after him, with all the treasures of Grecian art. (See Byzantine Empire.) One of the chief influences in Byzantine art was Christianity, and to a certain extent Byzantine art may be recognized as the endeavor to give expression to the new elements which Christianity had brought into the life of men. The tendency toward Oriental luxuriousness and splendor of ornament now quite supplanted the simplicity of ancient taste. Richness of material and decoration was the aim of the artist rather than purity of conception. Yet the classical ideals of art, and in particular the traditions of technical processes and methods carried to Byzantium by the artists of the Western Empire, held their ground long enough, and produced work pure and powerful enough, to kindle the new artistic life which began in Italy with Cimadue and Giotto.

Byzantine architecture may be said to have assumed its distinctive features in the church of St. Sophia built by Justinian in the 6th century, and still existing as the chief mosque in Constantinople. It is more especially the style associated with the Greek Church as distinguished from the Roman. The leading forms of the Byzantine style are the round arch, the circle, and in particular the dome. The last is the most conspicuous and characteristic object in Byzantine buildings, and the free and full employment of it was arrived at when by the use of pendentives the

and with this intent mosaics wrought on grounds of gold or of positive color are profusely introduced, while colored marbles and stones of various kinds are greatly made use of. The capitals are of peculiar and original designs, the most characteristic being square and



Byzantine Architecture—Part of the nave of the Palatine chapel, Palermo.

tapering downward, and they are very varied in their decorations. Byzantine architecture may be divided into an older and a newer (or Neo-Byzantine) style. The most distinctive feature of the latter is that the dome is raised on a perpendicular circular or polygonal piece of masonry (technically the drum) containing windows for lighting the interior, while in the older style the light was admitted by openings in the dome itself. The Cathedral of Athens (shown in the accompanying cut) is an example of the Neo-Byzantine style. The Byzantine style had a great influence on the architecture of Western Europe, especially in Italy, where St. Mark's in Venice is a magnificent example, as also in Sicily. It had also material influence in Southern France and Western Germany.

**BYZANTINE EMPIRE**, the Eastern Roman Empire, so called from its capital Byzantium or Constantinople. The Byzantine Empire was founded in A.D. 395, when Theodosius at his death divided the Roman Empire between his sons Arcadius and Honorius. In this empire the Greek language and civilization were prevalent; but the rulers claimed still to be Roman emperors, and under their sway the laws and official forms of Rome were maintained. It lasted for about a thousand years after the downfall of the Western Empire. It is also known as the Greek Empire or Lower Empire. Its capital was naturally Constantinople, a city established by Constantine in 330 as the new capital of the whole Roman Empire.

The Eastern Empire, then comprising Asia Minor, Syria, Egypt, Greece, Thrace, Moesia, Macedonia, and Crete, fell to Theodosius's elder son Arcadius, through whose weakness and that of several of his immediate successors it suffered severely from the encroachments of Huns, Goths, Bulgarians, and Persians. In 527 the celebrated Justinian succeeded, whose reign is famous for the codification of Roman law, and the victories of his generals Belisarius and Narses over the Vandals in Africa, and the Goths in Italy, which was henceforth governed for the Eastern Empire by an exarch residing at Ravenna. But his energy could not revive the decaying strength of the empire, and Justin II. his successor (565-578), a weak and avaricious prince, lost his reason by the reverses encountered in his conflicts with plundering Lombards, Avars, and Persians. Tiberius, a captain of the guard, succeeded in 578, and in 582 Maurice; both were men of ability. In 602 Phocas, proclaimed emperor by the army, succeeded, and produced by his incapacity the greatest disorder in the empire.

The empire was in sore straits when Leo the Isaurian (Leo III.), general of the army of the East, mounted the throne (716), and a new period of comparative prosperity began. Some writers date the beginning of the Byzantine Empire proper, and the end of the Eastern Roman Empire, from this era. Numerous reforms, civil and military, were now introduced, and the worship of images was prohibited. After an interval of three centuries of indifferent history Isaac Comnenus, the first of the Comnenian dynasty, ascended the throne, but soon after became a monk. The three chief emperors of this dynasty were Alexius, John, and Manuel Comnenus. During the reign of Alexius I. (1081-1118) the Crusades commenced. His son, John II., and grandson, Manuel I., fought with success against the Turks, whose progress also was considerably checked by the Crusaders. The Latins, the name given to the French, Venetian, etc., crusaders, now forced their way to Constantinople (1204), conquered the city, and retained it, together with most of the European territories of the empire. Baldwin, count of Flanders, was made emperor; Boniface, marquis of Montferrat, obtained Thessalonica as a kingdom, and the Venetians acquired a large extent of territory. Theodore Lascaris seized on the Asiatic provinces, in 1206 made Nice (Nicaea) the capital of the empire, and was at first more powerful than Baldwin. Neither Baldwin nor his successors, Henry, Peter, and Robert of Courtenay, were able to secure the tottering throne. John, emperor of Nice, conquered all the remaining Byzantine territory except Constantinople, and at last, in 1261, Michael Palæologus, king of Nice, conquered Constantinople, and thus overthrew the Latin dynasty.

In 1361 Sultan Amurath took Adrianople. Bajazet conquered almost all the European provinces except Constantinople, and was pressing it hard when Timur's invasion of the Turkish provinces saved Constantinople for this



Byzantine Architecture—Ancient cathedral, Athens.

architects were enabled to place it on a square apartment instead of a circular or polygonal. In this style of building incrustation, the incrustation of brick with more precious materials, was largely in use. It depended much on color and surface ornament for its effect,



time (1402). Manuel then recovered his throne, and regained some of the lost provinces from the contending sons of Bajazet. To him succeeded his son John, Palæologus II. (1425), whom Amurath II. stripped of all his territories except Constantinople, and laid under tribute (1444). To the Emperor John succeeded his brother Constantine Palæologus. With the assistance of his general Giustiniani, a Genoese, he with-

stood the superior forces of the enemy with fruitless courage, and fell in the defense of Constantinople, by the conquest of which (May 29, 1453) Mohammed II. put an end to the Greek or Byzantine Empire. The Byzantine Empire, which thus lasted for over a thousand years, was of immense service to the world in stemming the tide of Mohammedan advance, in spreading Christianity and civilization, and in maintaining a regular system of govern-

ment, law, and policy in the midst of surrounding barbarism.

**BYZAN'TIUM**, the original name of the city of Constantinople. It was founded by Greek colonists in 658 B.C., and owing to its favorable position for commerce it attained great prosperity, and survived the decay of most of the other Greek cities. In A.D. 330 a new era began for it when Constantine the Great made it the capital of the Roman Empire. See Constantinople.

## C

**C**, the third letter in the English alphabet and the second of the consonants. In English it serves to represent two perfectly distinct sounds, namely, the guttural sound pertaining to k and the hard or thin sound of s, the former being that which historically belongs to it; while it also forms with h the digraph ch. The former sound it has before the vowels a, o, and u, the latter before e, i, and y. The digraph ch has three different sounds, as in church, chaise, and chord. To these the Scotch adds a fourth, heard in the word loch.

**C**, in music, (a) after the clef, the mark of common time, in which each measure is a semibreve or four minims, corresponding to  $\frac{2}{2}$  or  $\frac{4}{4}$  and when a bar is perpendicularly drawn through it alla-breve time or a quicker movement is indicated. (b) The name of the first or key-note of the modern normal scale, answering to the do of the Italians and the ut of the French.

**CAALING WHALE** (kā'ing), the round-headed porpoise, a cetaceous animal of the dolphin family, characterized by a rounded muzzle and a convex head, attaining a size of 16 to 24 feet. It frequents the shores of Orkney, Shetland, the Faroe Islands, and Iceland, appearing in herds of from 200 to 1000, and numbers are often caught. They live on cod, ling, and other large fish, and also on molluscs, especially the cuttlefishes.

**CAB**, a kind of hackney-carriage with two or four wheels drawn by one horse. The original cab was for only one passenger besides the driver, and was a kind of hooded chaise.

**CABBAGE**, the popular name of various species of cruciferous plants, especially applied to the plain-leaved, hearting, garden varieties, cultivated for food. The kinds most cultivated are the common cabbage, the savoy, the broccoli, and the cauliflower. The common cabbage forms its leaves into heads or bolls, the inner leaves being blanched. Its varieties are the white, the red or purple, the tree or cow cabbage for cattle (branching and growing when in flower to the height of 10 feet), and the very delicate Portugal cabbage. The garden sorts form valuable culinary vegetables, and are used at table in various ways. In Germany pickled cabbage forms a sort of national dish, known as sauerkraut.

**CABBAGE-PALM**, a name given to various species of palm-trees from the circumstance that the terminal bud,

which is of great size, is edible and resembles cabbage, one of which is a native of the West Indies, the simple unbranched stem of which grows to a height of 150 or even 200 feet. The unopened bud of young leaves is much prized as a vegetable, but the removal of it completely destroys the tree, as it is unable to produce lateral buds.

**CABINET**, the collective body of ministers who direct the government of a country. In Britain, though the executive government is vested nominally in the crown, it resides practically in a committee of ministers called the cabinet. Every cabinet includes the first lord of the treasury, who is usually (not always) the prime-minister or chief of the ministry, and therefore of the cabinet; the lord-chancellor, the lord-president of the council, the chancellor of the exchequer, the first lord of the admiralty, and the five secretaries of state. A number of other ministerial functionaries, varying from two to eight, have usually seats in the cabinet, and its members belong to both houses of parliament, but usually adhere to that political party which predominates for the time being in the House of Commons. Its meetings are secret, and no minutes of the proceedings are taken. Although the cabinet is regarded as an essential part of the institutions of Great Britain, it has never been recognized by act of parliament. It began to take its present form in the reign of William III.

In the United States the cabinet of the president is appointed by him and assists him in his administration. It consists of the following officials: secretary of state, secretary of the treasury, secretary of war, attorney-general, postmaster-general, secretary of the navy, secretary of the interior, secretary of agriculture, and secretary of commerce and labor. By an act of congress which went into effect Jan. 19, 1886, in case of removal by death, resignation, or inability of both the president and the vice-president, the secretary of state, and after him, in the order above given, the other members of the cabinet, shall act as president until the disability of the president is removed or a new president is elected. The departments of agriculture and of labor and commerce were created after the passage of the above law.

**CABLE**, a large strong rope or chain, such as is used to retain a vessel at anchor. It is made usually of hemp or iron, but may be made of other mate-

rials. A hemp cable is composed of three strands, each strand of three ropes, and each rope of three twists. A ship's cable is usually 120 fathoms or 720 feet in length; hence the expression a cable's length. Chain-cables have now almost superseded rope-cables. Although deficient in elasticity, heavier, and more difficult of management, yet their immunity from chafing and rotting, their greater compactness for stowage, and the fact that from their greater weight the strain is exerted on the cable rather than on the ship, more than counterbalance these drawbacks.—A submarine telegraph cable is composed of one or more copper wires embedded in a compound of gutta percha and resinous substances, encircled by layers of gutta percha or india-rubber, hemp or jute padding, and coils of iron wire.

**CABLE**, a bundle of wires for the conduction of electricity, covered with substances which protect the wires from harm, the wires themselves being separately insulated. Cables are used in several ways: they are strung along posts exposed to the air, or upon houses, or other structures; they are placed underground in conduits, or otherwise; and they are laid in the beds of bodies of water. Various materials are used for their insulation and protection, such as rubber, bitumen, jute, hemp, or oil paper, wax or other resins, rubber tape, and other materials, depending upon the situation of the cable and the nature of the reagents which attack it.

**CABLE**, George Washington, an American writer and novelist, born in New Orleans in 1844. He was early engaged in journalism, and his first work of fiction was *Old Creole Days*, a number of short stories of Louisiana and New Orleans. He has published *The Granddissimes*, *Madame Delphine*, *Dr. Sevier*, *Bonaventure*, and other highly original works of fiction. Since 1885 he has been living in New England.

**CABLE-MOLDING**, in architecture, a molding with its surface cut in imitation of the twisted strands of a rope.

**CABOOSE**, the cookroom or kitchen of a ship. In smaller vessels it is an inclosed fireplace, hearth, or stove for cooking on the main deck.

**CABOT**, Sebastian, navigator, was born at Bristol about 1474, died about 1557. He was the son of John Cabot, a Venetian pilot, who resided at Bristol, and was highly esteemed for his skill in navigation. In 1497, in company with his father and two brothers, he dis-









Mr. Burbank, the great creator of new species of plant life, spent ten years in producing a cactus that was without thorns and spines. In the production of this species, which shows no disposition to revert to its former armored state, the western desert country will become a paradise for the herds of the rancher, and as the new species thrives without moisture it will, in making irrigation unnecessary, save the people and the government, millions of dollars. These cacti have become easily edible for stock, and are preferred to alfalfa or timothy. The fruit of the cactus is of a flavor to appeal to the palate of a Lucullus, being likewise wholesome and nutritious.

The evolution of this plant is no more remarkable than Mr. Burbank's "white" blackberry, or the hybrid English walnut and many other wonderful creations of his. Perhaps the most wonderful evidence of evolution in plant life is the Burbank potato, which has placed the most essential of all foods beyond possibility of the crop failure.









CACTI.



covered the mainland of N. America, having visited Nova Scotia and Newfoundland. In 1517 he made an attempt to discover the northwest passage, visiting Hudson's Bay. In 1526, when in the



Sebastian Cabot.

Spanish service, he visited Brazil and the river Plata. In 1548 he again settled in England, and received a pension from Edward VI. He was the first who noticed the variations of the compass; and he published a large map of the world.

**CABRAL'**, Pedro Alvarez, the discoverer (or second discoverer) of Brazil, a Portuguese, born about 1460, died about 1526. In 1500 he received command of a fleet bound for the East Indies, and sailed from Lisbon, but having taken a course too far to the west he was carried by the South American current to the coast of Brazil, of which he took possession in name of Portugal. Continuing his voyage, he visited Mozambique, and at last reached India, where he made important commercial treaties with native princes, and then returned to Europe.

**CABUL** (kā-bul'), capital of the kingdom of Afghanistan, 165 miles from the

and other public buildings, the fort, etc. Cabul carries on a considerable trade with Hindustan through the Khyber Pass. It was taken by the British in 1839 and in 1842, and on the occasion of a subsequent war with the British in 1879 Cabul was twice taken by their troops. Pop. 75,000.—The Cabul river rises in Afghanistan at the height of about 8400 feet, flows eastward, passes through the Khyber Pass into India, and falls into the Indus at Attock. Length 300 miles.

**CACA'O**, or **CO'COA**, the chocolate-tree, and also the powder and beverage made with it obtained from the fruit of this tree. The tree is 16 to 18 feet high, a native of tropical America, and much cultivated in the tropics of both hemispheres, especially in the West India Islands, Central and South America. Its fruit is contained in pointed, oval, ribbed pods 6 to 10 inches long, each inclosing 50 to 100 seeds in a white, sweetish pulp. These are very nutritive, containing 50 per cent of fat, are of an agreeable flavor, and used, both in their fresh state and when dried, as an article of diet. Cocoa and chocolate are made from them, the former being a powder obtained by grinding the seeds, and often mixed with other substances when prepared for sale, the latter being this powder mixed with sugar and various flavoring matters and formed into solid cakes. The seeds when roasted and divested of their husks and crushed are known as cocoa nibs. The seeds yield also an oil called butter of cacao, used in pomatum and for making candles, soap, etc. The term cocoa is a corruption of cacao, but is more commonly used in commerce: cocoanuts, however, are obtained from an entirely different tree.

**CACHALOT** (kash'a-lot). See Sperm-whale.

**CACHE** (kāsh), a hole in the ground for hiding and preserving provisions which it is inconvenient to carry: used

and countersigned by a secretary of state. They were at first made use of occasionally as a means of delaying the course of justice, but they appear to have been rarely employed before the 17th century as warrants for the detention of private citizens, and for depriving them of their personal liberty. During the reign of Louis XIV. their use became frightfully common, and by means of them persons were imprisoned for life or for a long period on the most frivolous pretexts. They were abolished at the Revolution.

**CACHOU** (ka-shō'), a sweetmeat in the form of a pill, made from the extract of licorice, cashew-nut, gum, etc., used by smokers to sweeten the breath.

**CACIQUE** (ka-sēk'), in some parts of America the title of the native chiefs at the time of the conquest by the Spaniards.

**CACTUS**, a Linnæan genus of plants, now used as a name for any of the Cactaceæ, otherwise called the Indian fig order. The species are succulent shrubs, with minute scale-like leaves



Cacti.

(except in the genus *Pereskia*, tree-cactus, with large leaves), and with clusters and spines on the stems. They have fleshy stems, with sweetish watery or milky juice, and they assume many peculiar forms. The juice in some species affords a refreshing beverage where water is not to be got. All the plants of this order, except a single species, are natives of America. They are generally found in very dry localities. Some are epiphytes. Several have been introduced into the Old World, and in many places they have become naturalized. The fruits of some species are edible, as the prickly-pear and the Indian fig, cultivated throughout the Mediterranean region. The flowers are usually large and beautifully colored, and many members of the order are cultivated in hot-houses.

**CADE**, John (better known as Jack Cade), a popular agitator of the 15th century, leader of an insurrection of the common people of Kent (1450) in the reign of Henry VI. Having defeated a force sent against him he advanced to London, which he ruled for two days. On a promise of pardon being given the rebels soon dispersed, but Cade himself was killed by a gentleman of Kent named Iden.

**CADENCE**, the concluding notes of a musical composition or of any well-defined section of it. A cadence is perfect, full, or authentic when the last chord is the tonic preceded by the dominant; it is imperfect when the chord of the tonic precedes that of the



Cabal—The bazaar during the fruit season.

Indian station and fort of Peshawur, 600 from Herat, and 290 from Candahar. It stands on the Cabul river, at an elevation of 6400 feet above sea-level. The citadel, Bala-Hissar, contains the palace

by settlers in the western states of America and Arctic explorers.

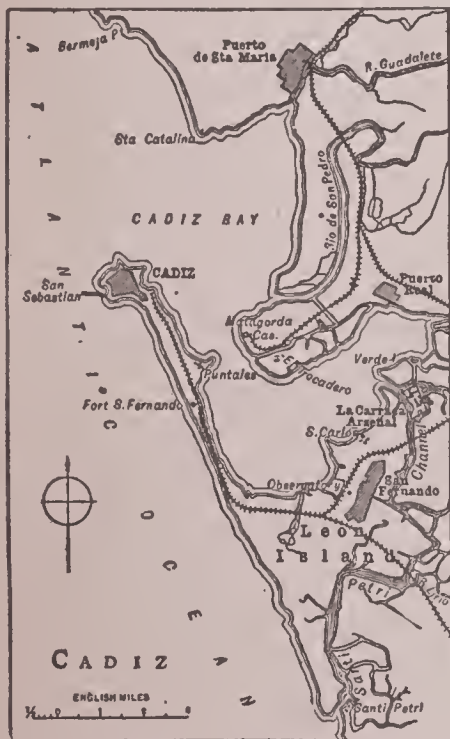
**CACHET** (kā-shā), *Lettre de*, a name given especially to letters proceeding from and signed by the kings of France,



dominant; it is plagal when the closing tonic chord is preceded by that of the sub-dominant; and it is interrupted, false, or deceptive when the base rises a second, instead of falling a fifth. Cadence, or cadenza, is the name also given to a running passage which a performer may introduce at the close of a movement.

**CADET**, a student in one of the military schools of the U. States, particularly that of West Point. The appointment of cadets to West Point is generally made after competitive examination, or from recommendation by a congressman, each congressional district being entitled to a cadet, each state to two cadets at large, and the U. States to thirty cadets at large. Cadets spend four years in school and then are commissioned in the army. A naval cadet is the holder of the lowest grade in the navy, being identical with that of midshipman.

**CADIZ** (kā-dēth'), a seaport of southwestern Spain, situated at the extremity of a long tongue of land projecting from the island of Leon, which is separated by a narrow (bridged) channel from the



coast of Andalusia. It is well built, well paved, and very clean, and is strongly fortified. The chief buildings are the great hospital, the custom-house, the old and new cathedrals, the theaters, the bull-ring, capable of accommodating 12,000 spectators, and the lighthouse of St. Sebastian. The bay of Cadiz is a large basin inclosed by the mainland on one side and the projecting tongue of land on the other, with good anchorage, and protected by the neighboring hills. It has four forts, two of which form the defense of the grand arsenal, La Carraca (4 miles from Cadiz), at which are large basins and docks. Cadiz has long been the principal Spanish naval station. Its trade is large, its exports being especially wine and fruit. Cadiz was founded by the Phœnicians about B.C. 1100, and was one of the chief seats of

their commerce in the west of Europe. Pop. 70,177.—The province of Cadiz is the most southerly in Spain; area, 2809 sq. miles; pop. 434,250.

**CADMIUM**, a scarce metal which resembles tin in color and luster, but is a little harder. It is very ductile and malleable; has a specific gravity of 8.6 to 8.69; and fuses a little below a red heat. In its chemical character it resembles zinc. It occurs in the form of carbonate, as an ingredient in various kinds of calamine, or carbonate of zinc. It is also found in the form of a sulphide, as the rare mineral greenockite. It forms at least two oxides, one chloride, and one sulphide.

**CADMIUM YELLOW**, a pigment prepared from the sulphide of cadmium. It is of an intense yellow color, and possesses much body.

**CADMUS**, in Greek legend, the son of Agenor and grandson of Poseidon (Neptune). He was said to have come from Phœnicia to Greece about 1550 B.C., and to have built the city of Cadmea or Thebes, in Bœotia. Herodotus and other writers ascribe the introduction of the Phœnician alphabet into Greece to Cadmus. The solar mythists identify him with the sun-god.

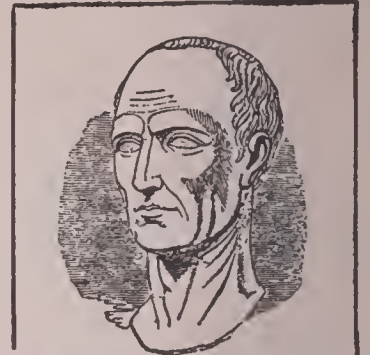
**CADUCEUS**, Mercury's rod; a winged rod entwisted by two serpents, borne by Mercury as an ensign of quality and office. In modern times it is used as a symbol of commerce, Mercury being the god of commerce. The rod represents power; the serpents, wisdom; and the two wings, diligence and activity.

**CÆDMON** (kad'mon), the first Anglo-Saxon of note who wrote in his own language, flourished about the end of the 7th century. His chief work (if it can all be attributed to him) consists of paraphrases of portions of the Scriptures, in Anglo-Saxon verse, the first part of which bears striking resemblances to Milton's narrative in *Paradise Lost*.

**CÆSAR**, a title, originally a surname of the Julian family at Rome, which, after being dignified in the person of the dictator Caius Julius Cæsar, was adopted by the successive Roman emperors, and latterly came to be applied to the heir-presumptive to the throne. The title was perpetuated in the Kaiser of the Holy Roman Empire, and in the Czar of the Russian emperors.

**CÆSAR**, Caius Julius, a great Roman general, statesman, and historian, was born B.C. 100, died B.C. 44. He was the son of the prætor Caius Julius Cæsar, and of Aurelia, a daughter of Aurelius Cotta. At the age of sixteen he lost his father, and shortly after he married Cornelia, the daughter of Lucius Cinna, the friend of Marius. This connection gave great offense to Sulla, the dictator, who proscribed him for refusing to put away his wife. His friends obtained his pardon with difficulty, and Cæsar withdrew from Rome, and went to Asia, serving his first campaign under M. Minucius Thermus, the prætor in Asia. On the death of Sulla Cæsar returned to Rome, where he distinguished himself as an orator. He afterward visited Rhodes, when he was taken by pirates, and compelled to pay fifty talents for his release. To revenge himself, he fitted out some vessels at Miletus, overtook the pirates,

made the greater number of them prisoners, and had them crucified before Pergamus. He now returned to Rome, where his eloquence and liberality made him very popular. He was pontifex



Julius Cæsar—Marble in Brit. Museum.

maximus in 63 B.C., prætor in 62 B.C., and governor of Spain in 61 B.C. On his return to Rome, having united with Pompey and Crassus in the memorable coalition called "the first triumvirate," he became consul, and then obtained the government of Gaul with the command of four legions. His military career was rapid and brilliant. He compelled the Helvetii, who had invaded Gaul, to retreat to their native country, subdued Ariovistus, who at the head of a German tribe had attempted to settle in the country of the Ædii, and conquered the Belgæ. In nine years he reduced all Gaul, crossed the Rhine twice (B.C. 55 and 53), and twice passed over to Britain, defeated the gallant natives of this island in several battles, and compelled them to give him hostages. The senate had continued his government in Gaul for another period of five years, while Pompey was to have the command of Spain, and Crassus that of Syria, Egypt, and Macedonia for five years also. But the death of Crassus in his campaign against the Parthians dissolved the triumvirate; and about the same time the friendship between Cæsar and Pompey cooled. The senate, influenced by Pompey, ordered that Cæsar should resign his offices and command within a certain time, or be proclaimed an enemy to the state, and appointed Pompey general of the army of the Republic. Upon this Cæsar urged his soldiers to defend the honor of their leader, passed the Rubicon (49 B.C.), and made himself master of Italy without striking a blow, Pompey retiring into Greece. Cæsar then levied an army with the treasures of the state, and hastened into Spain, which he reduced to submission without coming to a pitched battle with Pompey's generals. He next conquered Marseilles (now Marseilles), and returned to Rome, where he was appointed dictator. He then followed Pompey into Greece, and defeated him at Pharsalia, from which Pompey escaped only to be assassinated in Egypt. In Rome the senate and the people strove eagerly to gain the favor of the victor. They appointed him consul for five years, dictator for a year, and tribune of the people for life. When his dictatorship had expired he caused himself to be chosen consul again, and without changing the ancient forms of government, ruled with almost unlimited power. In 46 B.C. he crossed



to Africa, defeated the Pompeians Scipio and Cato at Chapsus, and returning to Rome he was received with the most striking marks of honor. The term of his dictatorship was prolonged to ten years, the office of censor conferred on him alone; his person was declared inviolable, and his statue placed beside that of Jupiter in the capitol. He soon after was honored with four several triumphs, made perpetual dictator, and received the title of imperator with full powers of sovereignty. In February, 44, he declined the diadem which Antony publicly offered him, and next morning his statues were decked with diadems. His glory, however, was short-lived, for a conspiracy was set on foot by his enemy Cassius, and joined by many of his own friends, including M. Brutus; and, notwithstanding dark hints had been given to him of his danger, he attended a meeting of the senate on 15th (ides) March, 44 B.C., and fell beneath the daggers of the conspirators. Of his writings, we still possess the history of his wars with the Gauls and with Pompey. Cæsar was undoubtedly "the foremost man of all this world," being great as a statesman, a general, an orator, a historian, and an architect and engineer, and his assassination was brought about more by jealousy and envy than by real patriotism.

**CÆSARE'A**, the ancient name of many cities, such as: (1) Cæsarea Philippi in Palestine, north of the Sea of Galilee, rebuilt by Philip, tetrarch of Galilee, son of Herod the Great.—(2) Cæsarea, on the shores of the Mediterranean, about 55 miles N.W. from Jerusalem, enlarged and beautified by Herod the Great, and named in honor of Cæsar Augustus; the place where St. Paul was imprisoned two years (Acts xxiii.-xxv.)—(3) The capital of Cappadocia in Asia Minor.

**CÆSA'REAN OPERATION**, a surgical operation, which consists in delivering a child by means of an incision made through the walls of the abdomen and womb; necessary when the obstacles to delivery are so great as to leave no other alternative. It is said to be so named because Julius Cæsar was brought into the world in this way.

**CÆSIUM**, a rare metal, first discovered by Bunsen and Kirchhoff by spectrum analysis in 1860; symbol Cs, atomic weight 133. It is soft, and of a silver-white color. It is always found in connection with rubidium. It belongs to the same group of elements with lithium, sodium, potassium, and rubidium, viz. the group of the alkali-metals.

**CAFF'EINE**, or **THE'INE**, the active principle of tea and coffee, a slightly bitter, highly azotized substance, crystallizing in slender, silk-like needles, found in coffee-beans, tea-leaves, Paraguay tea, guarana, etc. Coffee contains from 0.8 to 3.6, and tea from 2 to 4 per cent. Doses of 2 to 10 grains induce violent nervous and vascular excitement.

**CAGE-BIRDS**, birds kept in cages as pets or songsters. A large traffic is done in birds of this description, particularly the so-called canary birds which are raised in the Hartz mountains and form

a large industry. The tame bird has, under these conditions, altered considerably from its wild ancestor in the Canary Islands. Other song birds kept in cages are mockingbirds, bullfinches, nightingales, goldfinches, cardinal birds, parrots, parakeets, cockatoos, and others are kept for their power of speech or beauty of plumage. In keeping cage birds the cage should be regularly cleaned, should be large, and the bird should be fed generously with proper food.

**CAGLIOSTRO** (kál-yos'trō), Count Alessandro (real name Giuseppe (Joseph) Balsamo), a celebrated charlatan, born in 1743 at Palermo. He was the son of poor parents, and entered the order of the Brothers of Mercy, where he acquired a knowledge of the elements of chemistry and physic. He left, or had to leave the order, and committed so many crimes in Palermo that he was obliged to abscond. He subsequently formed a connection with Lorenza Feliciani, whose beauty, ability, and want of principle made her a valuable accomplice in his frauds. With her he traveled through many countries, assuming other names besides that of Count Cagliostro, pretending to supernatural powers, and wringing considerable sums from those who became his dupes. In England he established an order of what he called Egyptian Masonry, in which, as grand kophta, he pretended to reveal the secrets of futurity, and made many dupes among the higher classes. In Paris he was implicated in the affair of the diamond necklace which caused so great a scandal in the reign of Louis XVI., and was imprisoned in the Bastille, but escaped by means of his matchless impudence. He afterward visited England, but met with little success. In 1789 he revisited Rome, where he busied himself about freemasonry, but being discovered, and

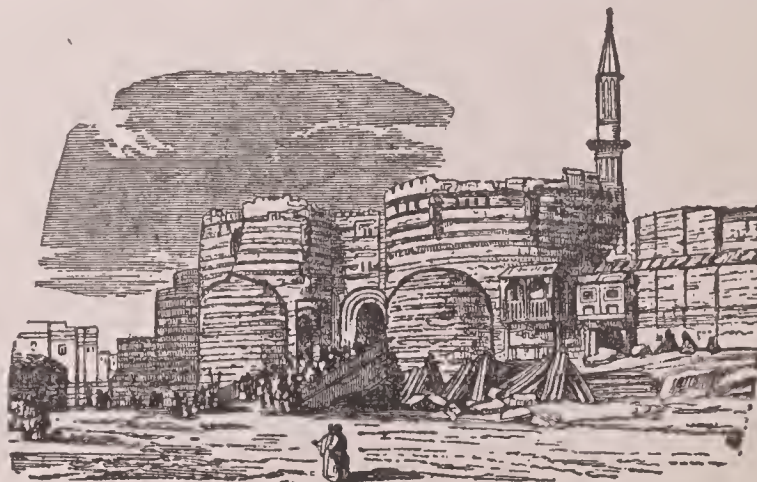
of Cain and his descendants see Gen. iv.-vii. A Gnostic sect of the 2d century called Cainites held that Cain was the offspring of a superior power and Eve, and Abel of an inferior power—the Jewish God, and that the killing of Abel symbolized the defeat of the inferior by the superior power.

**CAINOZO'IC**, a geological term applied to the latest of the three divisions into which strata have been arranged, with reference to the age of the fossils they include. The Cainozoic system embraces the tertiary and posttertiary systems of British geologists, exhibiting recent forms of life, in contradistinction to the Mesozoic, exhibiting intermediate, and the Palæozoic, ancient and extinct, forms. It corresponds nearly with what has been called the age of mammals.

**CAIQUE** (ká-ék'), a small skiff or rowing boat; especially a light skiff used in the Bosphorus, where it almost monopolizes the boat traffic. It may have from one to ten or twelve rowers. The name is also given to a Levantine vessel of a larger size.

**CAIRN** (kārñ), a heap of stones; especially one of those large heaps of stones common in Great Britain, particularly in Scotland and Wales, and generally of a conical form. They are of various sizes, and were probably constructed for different objects. Some are evidently sepulchral, containing urns, stone chests, bones, etc. Some were erected to commemorate some great event, others appear to have been intended for religious rites, while the modern cairn is generally set up as a landmark.

**CAIRO** (kí'rō), the capital of Modern Egypt, is situated on the right bank of the Nile, 12 miles above the apex of its delta, and 150 miles by rail from Alexandria. The character of the town is still mainly Arabic, though in modern times the European style in architecture and other matters has become more and



Gateway of the citadel, Cairo.

committed to the Castle of St. Angelo, he was condemned by a decree of the pope to imprisonment for life as a freemason, an arch-heretic, and a very dangerous foe to religion. He died in prison in 1795.

**CAI'MAN**, or **CAY'MAN**. See Alligator.

**CAIN**, the eldest son of Adam and Eve; the first murderer, who slew his brother Abel. For the biblical history

more prevalent. The city is partly surrounded by a fortified wall, and is intersected by seven or eight great streets, from which run a labyrinth of narrow crooked streets and lanes. There are several large squares or places, the principal being the Ezbekiyeh. To the southeast of the town is the citadel, on the last spur of the Mokattam Hills, overlooking the city. It contains the fine mosque of Mohammed Ali, a well



270 feet deep called Joseph's Well, cut in the rock, the palace of the viceroy, etc. There are upward of 400 mosques. The finest is that of Sultan Hassan. There are also some forty Christian churches, Jewish synagogues, etc. The tombs in the burying-grounds outside the city also deserve mention, especially those known as the tombs of the Caliphs. The trade of Cairo is large, and the bazaars and markets are numerous. Of these the Khan el Khalili, in the northeast of the town, consists of a series of covered streets and courts in which all kinds of eastern merchandise are displayed in open stalls. Cairo has railway communication with Alexandria, Suez, and Siout. It was occupied by the British, Sept. 1882. Pop. 570,062.

**CAIRO** (kā-rō), a city, port of entry, and county-seat of Alexander Co., Ill., at the junction of the Mississippi and Ohio rivers, 150 miles southeast of Saint Louis, on the Illinois Central, Cleveland, Cincinnati, Chicago and Saint Louis, and other railroads. Pop. 15,141.

**CAIS'SON**. In civil engin. (a) a vessel in the form of a boat used as a flood-gate in docks. (b) An apparatus on which vessels may be raised and floated; especially a kind of floating-dock, which may be sunk and floated under a vessel's keel, used for docking vessels while at their moorings, without removing stores or masts. (c) A water-tight box or casing used in founding and building structures in water too deep for the cofferdam, such as piers of bridges, quays, etc.

**CAITH'NESS**, a county occupying the extreme northeast of the mainland of Scotland; area, 438,878 acres, of which about a fourth is under crop. Caithness gives the title of earl to the head of the Sinclair family. It returns one member to Parliament. Pop. 33,859.

**CALABAR BEAN**, the seed of a leguminous African plant, nearly allied to the kidney-bean. It is a powerful narcotic poison, operating also as a purgative and emetic, and in virtue of these last qualities is the famous "ordeal bean" of Africa, administered to persons suspected of witchcraft. If it causes purging it indicates crime; if vomiting, innocence. It induces fainting fits and asphyxia, and weakens or paralyzes the action of the heart. It is employed in medicine, chiefly (externally) as an agent for producing contraction of the pupil of the eye in certain cases; sometimes also (internally) in neuralgia, tetanus, and rheumatism.

**CAL'ABASH**, a vessel made of a dried gourd-shell or of a calabash shell, used in some parts of America and Africa. They are so closely grained and hard that when they contain any liquid they may be put on the fire as kettles.

**CALA'BRIA**, a name anciently given to the peninsula at the southeastern extremity of Italy, but now applied to the s.w. peninsula in which Italy terminates; area 6663 sq. miles; pop. 1,304,980. Scene in 1908 of the greatest earthquake of modern times. (See earthquake.)

**CALAIS** (kā-lā), a fortified seaport town of France, dep. Pas-de-Calais, on the Strait of, and 25 miles s.e. of Dover,

and distant 184 miles by rail from Paris. Pop. 56,857.

**CALAMAN'DER WOOD**, a beautiful species of wood, the product of Ceylon. It resembles rosewood, but is so hard that it is worked with great difficulty. It takes a very high polish, and is wrought into chairs and tables, and yields veneers of almost unequaled beauty.

**CAL'AMARY**, the general name for two-gilled decapod cuttle-fishes. The body is oblong, soft, fleshy, tapering, and flanked behind by two triangular fins, and contains a pen-shaped gladius or internal horny flexible shell. They have the power of discharging, when alarmed or pursued, a black fluid from an ink-bag. The species are found in all seas, and furnish food to dolphins, whales, etc. Some species can dash out of the water and propel themselves through the air for 80 or 100 yards. It occasionally grows to the length of 2½ feet. Called also Squid.

**CAL'AMUS**, a genus of palms, the stems of the different species of which are the rattan-canes of commerce. The genus holds a middle station between the grasses and palms, with the habit of the former and the inflorescence of the latter. The species are principally found in the hotter parts of the East Indies.

**CALAS** (kā-lā), Jean, a memorable victim of fanaticism, born 1698, executed 1762. He was a Protestant, and was engaged as a merchant in Toulouse, when his eldest son committed suicide; and as he was known to be attached to the Roman Catholic faith, a cry arose that he had on that account been murdered by his father. Jean Calas and his whole family were arrested, and a prosecution instituted against him, in support of which numerous witnesses came forward. The parliament of Toulouse condemned him, by eight voices against five, to be tortured and then broken on the wheel, which sentence was carried out, his property being also confiscated. Voltaire became acquainted with his family, and procured a revision of the trial, when Calas was declared innocent, and his widow pensioned.

**CALCA'REOUS**, a term applied to substances partaking of the nature of lime, or containing quantities of lime. Thus we speak of calcareous waters, calcareous rocks, calcareous soils.—Calcareous spar, crystallized carbonate of lime. It is found crystallized in more than 700 different forms, all having for their primitive form an obtuse rhomboid.—Calcareous tufa, an alluvial deposit of carbonate of lime, formed generally by springs, which, issuing through limestone strata, hold in solution a portion of calcareous earth; this they deposit on coming in contact with air and light. Calc-sinter is a variety of it.

**CALCINATION**, the operation of roasting a substance or subjecting it to heat, generally with the purpose of driving off some volatile ingredient, and so rendering the substance suitable for further operations. The term was formerly also applied to the operation of converting a metal into an oxide or metallic calx: now called oxidation.

**CAL'CITE**, a term applied to various minerals all of which are modifications of the rhombohedral form of carbonate of calcium. It includes limestone, all the white and most of the colored marbles, chalk, Iceland-spar, etc.

**CAL'CIUM**, the metallic base of lime; in the metallic state, one of the rarest of substances; combined, one of the most abundant and most widely distributed. As phosphate, it forms the main part of the mineral matter of the bones of animals; as carbonate, chalk, limestone, or marble, it forms mountain ranges; as sulphate or gypsum, large deposits in various geological formations; it is a constituent of many minerals, as fluor-spar, Iceland-spar, etc., and is found in all soils, in the ash of plants, dissolved in seawater, and in springs, both common and mineral. It was first obtained in the metallic state by Sir H. Davy in 1808. When quite pure, it is a pale-yellow metal, with a high luster. It is about one and a half times as heavy as water, ductile, malleable, and very oxidizable. Its salts are for the most part insoluble or sparingly soluble in water, but dissolve in dilute acids.

**CALC-SINTER**, a carbonate of lime, the substance which forms the stalactites and stalagmites that beautify many caves.

**CALCULATING MACHINES**, contrivances by which the results of arithmetical operations may be obtained mechanically. Modern calculating machines are those invented by Kummer in 1847, and by Lagrou, Djakoff and Webb. The most commonly used machine is called the slide rule machine, by which the multiplication of large numbers can be quickly done. They are based upon the principle of logarithms. The following machines are extensively used: Beher's addition machine (1892), of keyboard type, limited to sums under 500; Illgen's calculator (1888), limited to sums under 1000; Runge's addition machine, Berlin (1896), adding numbers of several figures; Felt's comptometer, Chicago (1887), keyboard type, performing all four operations; Burrough's registering accountant, Saint Louis (1888), an addition machine of 81 keys, with a capacity of 2000 entries per hour, and automatically printing both the addenda and the total sum; Carney's cash register, Dayton (1890), an adding and printing machine of great perfection.

**CALCULATORS, LIGHTNING**, prodigies having an unusual capacity for combining numbers. Thus, at the age of 6, T. H. Safford computed mentally the number (617,760) of barley corns in 1040 rods, and could extract the cube roots of numbers of 9 and 10 figures. Buxton solved the problem, to find the product of doubling a farthing 139 times, the result, expressed in pounds, being a number of 39 figures. Zerah Colburn, at 9 years of age, gave at sight the factors of 294,967,297, and in 20 seconds found mentally the number of hours in 1811 years. Raising 991 to the fifth power in 13 operations, and giving the product of any pair of tow-figure numbers in 1½ seconds, are feats accomplished by Arthur Griffith, who also



memorized the squares of all numbers up to 130 and the cubes up to 100. Other noted prodigies are Annich, Bidder, Vinckler, Pughiesi, Mondeux, Magimelle, and Inaudi.

**CALCULUS**, The Infinitesimal or Transcendental Analysis, a branch of mathematical science. The lower or common analysis contains the rules necessary to calculate quantities of any definite magnitude whatever. But quantities are sometimes considered as varying in magnitude, or as having arrived at a given state of magnitude by successive variations. This gives rise to the higher analysis, which is of the greatest use in the physico-mathematical sciences. Two objects are here proposed: First, to descend from quantities to their elements. The method of effecting this is called the differential calculus. Second, to ascend from the elements of quantities to the quantities themselves. This method is called the integral calculus. Both of these methods are included under the general name infinitesimal or transcendental analysis. Those quantities which retain the same value are called constant; those whose values are varying are called variable. When variable quantities are so connected that the value of one of them is determined by value ascribed to the others, that variable quantity is said to be a function of the others. A quantity is infinitely great or infinitely small, with regard to another, when it is not possible to assign any quantity sufficiently large or sufficiently small to express the ratio of the two. When we consider a variable quantity as increasing by infinitely small degrees, if we wish to know the value of these increments, the most natural mode is to determine the value of this quantity for any given period, as a second of time, and the value of the same for the period immediately following. This difference is called the differential of the quantity. The integral calculus, as has been already stated, is the reverse of the differential calculus. There is no variable quantity expressed algebraically, of which we cannot find the differential; but there are differential quantities which we cannot integrate: some because they could not have resulted from differentiation; others because means have not yet been discovered of integrating them. Newton was the first discoverer of the principles of the infinitesimal calculus, having pointed them out in a treatise written before 1669, but not published till many years after. Leibnitz, meanwhile, made the same discovery, and published it before Newton, with a much better notation, which is now universally adopted.

**CALCULUS**, in pathology, a general term for the various inorganic concretions which are sometimes formed in the body. Such are biliary calculi or gall-stones, formed in the gall bladder, urinary calculi, formed by a morbid deposition from the urine in the kidney or bladder; and various others known as salivary, arthritic, pancreatic, lachrymal, etc. Urinary and biliary calculi are the most common. The former, when the particles are comparatively

small in size, are known as gravel, when larger as stone. Both cause painful and dangerous symptoms.

**CALCUTTA**, capital of British India and of Bengal; situated about 80 miles from the sea, on the left bank of the Hooghly (Hugli'), a branch of the Ganges, navigable up to the city for large vessels. The river opposite the city varies in breadth from about two furlongs to three-quarters of a mile. Calcutta extends along the river for about five miles from north to south, stretching eastward for nearly two miles in the south and in the north narrowing to half a mile. Adjacent to the city proper are extensive suburbs, which include the large town of Howrah on the opposite side of the Hooghly, connected

educational institutions are Calcutta Medical College, government school of art, a school of engineering, and Calcutta University, an examining and degree-conferring institution. Pop. 1,026,987.

**CALDERON' DE LA BARCA**, Don Pedro, the great Spanish dramatist, born at Madrid, 1600. Before his fourteenth year he had written his third play. Leaving Salamanca in 1625, he entered the army and served with distinction for ten years in Milan and the Netherlands. In 1636 he was recalled by Philip IV., who gave him the direction of the court entertainments. The next year he was made knight of the order of Santiago, and he served in 1640 in the campaign in Catalonia. Besides heroic comedies and historical plays, some of which merit



Calcutta—Bazaar on the Chitpore road.

with Calcutta by a pontoon bridge. The celebrated Fort William is a magnificent octagonal work, said to have cost altogether \$10,000,000. It was built in 1757-73, being begun by Clive after the battle of Plassey. Government-house, or the palace of the governor-general, built by the Marquis Wellesley at an expense of \$5,000,000, stands on the Esplanade, a street or road running along the north side of the Maidan. Here also are the high court and the town-hall, other buildings in this quarter being the currency-office, post-office, Bank of Bengal, mint, etc. The churches include the cathedral, St. John's (the old cathedral), St. Andrew's Scotch Church, Roman Catholic cathedral, etc. Calcutta has an extensive system of internal navigation through the Ganges and its connections, as also by the railways (the chief of which start from Howrah), and it almost monopolizes the external commerce of this part of India. The principal exports are opium, cotton, rice, wheat, jute, gunny-bags, tea, indigo, seeds, raw silk, etc. Of the imports the most important in respect of value are cotton goods. The jute manufacture is extensively carried on, as also that of cottons. The religious, educational, and benevolent institutions of Calcutta are numerous. The educational institutions comprise the Presidency College, the Mohammedan College, and the Sanscrit College, all government colleges besides others mainly supported by missionary or native efforts. Other

the name of tragedies, Calderon wrote hundreds of preludes, farces, etc. He wrote his last play in the eightieth year of his age. His smaller poems are now forgotten; but his plays have maintained their place on the stage even more than those of Lope de Vega. He died May 25, 1681.

**CALEDONIA**, Caledonians, the names by which the northern portion of Scotland and its inhabitants first became known to the Romans, when in the year 80 Agricola occupied the country up to the line of the Firths of Clyde and Forth. He defeated the Caledonians in 83, and again at Mons Grampius in 84, a battle of which a detailed description is given by Tacitus. In the early part of the 3d century they maintained a brave resistance to Severus, but the name then lost its historic importance. Caledonia is now used as a poetical name of Scotland.

**CAL'ENDAR**, a record or marking out of time as systematically divided into years, months, weeks, and days. The periodical occurrence of certain natural phenomena gave rise to the first division of time, the division into weeks being the only purely arbitrary partition. The year of the ancient Egyptians was based on the changes of the seasons alone, without reference to the lunar month, and contained 365 days divided into twelve months of thirty days each, with five supplementary days at the end of the year. The Jewish year consisted of lunar months of which they reckoned twelve in the year, intercalating a



thirteenth when necessary to maintain the correspondence of the particular months with the regular recurrence of the seasons. The Greeks in the earliest period also reckoned by lunar and intercalary months, but after one or two changes adopted the plan of Meton and Euctemon, who took account of the fact that in a period of nineteen years, the new moons return upon the same days of the year as before. This period of nineteen years was found, however, to be about six hours too long, and subsequent calculators still failed to make the beginning of the seasons return on the same fixed day of the year. Each month was divided into three decads. The Romans at first divided the year into ten months, but they early adopted the Greek methods of lunar and intercalary months, making the lunar year consist of 354, and afterward of 355 days, leaving ten or eleven days and a fraction to be supplied by the intercalary division. This arrangement continued till the time of Cæsar. The first day of the month was called the calends. In March, May, July, and October the 15th, in other months the 13th, was called the ides. The ninth day before the ides (reckoning inclusive) was called the nones, being therefore either the 7th or the 5th of the month. From the inaccuracy of the Roman method of reckoning the calendar came to represent the vernal equinox nearly two months after the event, and at the request of Julius Cæsar, the Greek astronomer Sosigenes, with the assistance of Marcus Fabius contrived the so-called Julian calendar. The chief improvement consisted in restoring the equinox to its proper place by inserting two months between November and December, so that the year 707 (B.C. 46), called the year of confusion, contained fourteen months. In the number of days the Greek computation was adopted, which made it 365. To dispose of the quarter of a day it was determined to intercalate a day every fourth year between the 23rd and 24th of February. This calendar continued in use among the Romans until the fall of the empire, and throughout Christendom till 1582.

By this time, owing to the cumulative error of eleven minutes, the vernal equinox really took place ten days earlier than its date in the calendar, and accordingly Pope Gregory XIII. issued a brief abolishing the Julian calendar in all Catholic countries, and introducing in its stead the one now in use, the Gregorian or reformed calendar. In this way began the new style, as opposed to the other or old style. Ten days were to be dropped; every hundredth year, which by the old style was to have been a leap year, was now to be a common year, the fourth excepted; and the length of the solar year was taken to be 365 days, five hours, forty-nine minutes, and twelve seconds, the difference between which and subsequent observations is immaterial. Russia alone retains the old style, which now differs twelve days from the new.

In France, during the revolution, a new calendar was introduced by a decree of the National Convention, Nov. 24, 1793. The time from which the new

reckoning was to commence was the autumnal equinox of 1792, which fell upon the 22nd of September, when the first decree of the new republic had been promulgated. The year was made to consist of twelve months of three decades each, and, to complete the full number, five fête days, or sansculotides (in leap years six) were added to the end of the year. The common Christian or Gregorian calendar was re-established in France on the 1st January, 1806, by Napoleon. For the Mohammedan calendar, see Hegira.

**CAL'ENDER**, a machine consisting of two or more cylinders (calenders) revolving so nearly in contact with each other that cloth or paper passed between them is smoothed and glazed by their pressure, or some other kind of finish is imparted to the surface.

**CALHOUN** (kal-hōn'), John Caldwell, an American statesman, born in 1782, died 1850. He was admitted to the bar of S. Carolina in 1807, and in 1811 was sent to Congress, where he distin-



*J. C. Calhoun*

guished himself by his eloquence. In 1817 he was made secretary of war under President Monroe; in 1825 he was elected vice-president of the United States; in 1831, a senator; in 1843 secretary of state, and in 1845, again a senator. He continued till his death an advocate of extreme state rights, and of the policy of the slave-holding states.

**CAL'IBER**, a technical term for the diameter of the bore of a firearm.

**CAL'ICO**, a general term for any plain white cotton cloth: in America it is usually applied to printed cottons.

**CALICO-PRINTING** is the art of applying colors to cloth after it has come from the hand of the weaver in such a manner as to form patterns or figures. This art, originally brought from India, is sometimes practised on linen, woolen, and silk, but most frequently upon that species of cotton cloth called calico. The process was first introduced into Britain in 1738, and was originally accomplished by means of hand-blocks made of wood on which patterns or parts of patterns for each different color were cut. The machinery now generally used consists of various modifications of the cylinder printing-

machine, in which a number of separate engraved cylinders are mounted, corresponding to the number of colors to be printed. Formerly the cloth had to pass once through the machine for every color; but now, by an arrangement of machinery equally ingenious and effective, any number of cylinders are fitted on one machine, which act on the cloth one after the other, and by this means the pattern is finished with a corresponding number of colors in the same time that was formerly employed to give one. A great variety of methods are employed in calico-printing, but they all fall under the general heads of dye-colors and steam-colors. Under the first head are included all the styles in which the pattern is printed on the cloth by a mordant—a substance which may have little or no color itself, but has an affinity for the fiber on the one hand, and for the coloring matter on the other—the dye or coloring matter being subsequently fixed by dyeing on such parts of the cloth as have been impregnated with the mordant, and thus bringing out the pattern. In steam-color printing the coloring material is applied to the cloth direct from the printing-cylinder, and subsequently fixed by steaming. In steam-colors there is no limit to the number and variety of shades which may be produced, each color-box on the cylinder printing-machine containing the whole ingredients essential to the production and fixation of a separate and distinct shade of color. This process is superseding most of the other styles, the brilliant coal-tar colors so extensively used being almost entirely fixed by steaming. The bodies used for fixing are tin mordants, tannic acid, etc., which are mixed with the dye-colors and printed together. The effects of calico-printing are varied by numerous other operations, such as the discharge-style, in which the cloth is first dyed all over, then printed in a certain pattern with discharge-chemicals, which either produce a pattern of some other color, or one purely white, as in the Turkey-red bandanna handkerchiefs. The resist-style, in some respects, is the reverse of the discharge-style; the process being to print a pattern in certain chemicals, which will enable those parts to resist the action of the dye subsequently applied to all other parts of the cloth. After the prints have undergone the printing process they are submitted to a series of finishing operations, the object of which is to give to the fabrics a pleasing appearance to the eye.

**CAL'ICUT**, a seaport of India, presidency of Madras, on the Malabar coast, which was ceded to the British in 1792. It was the first port in India visited by Europeans, the Portuguese adventurer, Pedro da Covilham having landed here about 1486, and Vasco da Gama in 1498. It has considerable trade, and manufactures cotton cloth, to which it has given the name calico. Pop. 76,981.

**CALIF** and **CALIFATE**. See Caliph. **CALIFORNIA**, one of the Pacific states, the second in size of the U. States, was ceded by Mexico to the United States in 1847, and in 1850 was admitted to the Union. It is bounded on the north by Oregon, on the south



by Mexico (Lower California), on the east by Nevada and Arizona, and on the west by the Pacific Ocean. Its population in 1906 was 1,750,000. California in many ways is the most interesting state in the Union. It is 750 miles long in a direct line, but has more than 800 miles of coast line. It has an average width of about 200 miles and a measured area of 155,980 sq. miles excluding bodies of water indented into the land, or a total of 158,360 sq. miles, including bays, lakes and inlets. To make the dimensions more clear to persons familiar with the geography of the Atlantic coast, it may be stated as being approximately true that California equals in area all of that country lying east of the Appalachian chain of mountains and extending from Port Royal, South Carolina to Boston, Massachusetts. The surface of California is extremely diversified. The Coast Range of mountains follows the coast line from the northern part of the state down two-thirds the length and then extends eastward to a junction with the Sierra Nevada range which parallels the Coast Range from the northern boundary to this junction, except that it is along the eastern border. Between these two ranges is included the great valley of California, nearly 600 miles in length, the ranges being distant from each other from 100 to 140 miles, a part of this distance being filled with local detached mountain areas and foot hill districts. The valley proper has an ordinary width of from 40 to 60 miles. Between the local detached ranges above mentioned and along the foot hills are many lesser valleys opening out into the big valley and on the western slope of the Coast Range are also many small valleys and some rather large ones opening out upon the sea coast. These valleys are extremely fertile and attractive, as also is the great interior valley. This interior valley is divided at about the middle of the upper two-thirds of the state into the Sacramento Valley, lying to the north and the San Joaquin Valley running to the south, each of these valleys being drained by rivers of the same name. The principal river is the Sacramento, which flows s. for upward of 300 miles, receiving numerous affluents from the Sierra Nevada, and falls into the Bay of Suisun. The San Joaquin rises in the Sierra Nevada, flows n. for about 250 miles, and joins the Sacramento about 15 miles above Suisun Bay. It receives the waters of Lake Tule or Tulares, and has numerous tributaries. The Bay of San Francisco, forming the most capacious harbor on the Pacific coast, is about 60 miles in length, 14 broad, and with a coast-line of 275 miles. It is connected with the ocean by a strait about 2 miles wide and from 5 to 7 long, called the Golden Gate. The city of San Francisco stands on the n.w. shore of the southern arm.

The peaks of the Sierra Nevada—Mount Shasta, Lassen's Butte, Spanish Peak, Pyramid Peak, Mounts Dana, Lyell, Brewer, Tyndall, Whitney, and others—reach from 10 000 to nearly 15,000 feet above the sea (Mount Whitney is 14,886). The volcanic character

of the state is manifested by the mountain formations; and earthquakes are frequent. California is celebrated for its many wonderful natural objects and remarkable scenery. Noteworthy are the Yosemite Valley (which see) and the "big tree groves" containing groups of giant redwood trees—some of which reach the height of nearly 400 feet.

The climate of California is peculiarly its own. Nothing else on the North American continent is comparable with it. In the valley portions of the state the year is divided into two seasons of approximately equal duration, commonly known as the wet and the dry season. The wet season extends from November to May, and during this part of the year the rains fall about as they do in the eastern states during the spring and summer, although, as a rule, less copiously. In the northern part of the state the rains are abundant; in the central part sufficient, and in the southern part half scanty to such an extent that irrigation must be employed in



Seal of California.

order to make agriculture certainly profitable. During the dry season rains seldom fall, although there may be showers earlier than November and later than May. The summers in the interior are warm. Along the coast the sun is warm, but the ocean breezes are always cool. California offers no climatic hardships. In the higher mountain altitudes there is a wintry season, not as cold as in the Atlantic states, but with a very much heavier snow fall.

Politically speaking, California is divided into fifty-seven counties. The legislature consists of forty senators, elected for four years and eighty assemblymen, elected for two years, and the legislature convenes biennially. The legislators draw pay at the rate of \$8.00 per day for 60 days and if the legislature sits longer than 60 days the legislators must serve without further compensation. The governor and other state officers are elected every four years, elections falling in mid-presidential terms so that national and state general elections do not occur simultaneously. In national elections the state in 1892 gave Cleveland eight and Harrison one electoral votes; in 1896 it gave McKinley eight and Bryan one. In the elections of 1900, 1904 and 1908, it went Republican.

For the fiscal year ending June 30, 1906, the property tax levied and collected in California amounted to \$7,590,387.87. There were collected from all other sources \$5,644,195.99, being a total of \$13,234,583.86. The disbursements on account of state government were \$12,945,862.73.

Included in this disbursement is one item of state aid to the common schools amounting to \$3,952,806.75, state aid to high schools being \$238,522.62, making a total of \$4,191,329.37.

California regards education as pre-eminently of concern to the whole commonwealth and therefore collects a large part of the entire educational fund from the state as a whole and disburses it to the several schools in a way that materially aids in supporting schools in sparsely settled districts.

California is liberal in sustaining educational institutions. Its support of the State University, with its 3300 students, is chiefly given in the form of a levy of two cents on each \$100 of assessed valuation of all property, although the university has special sources of revenue in addition to this. Besides the common and high schools and the State University, the state supports five normal training schools, two industrial state schools and one polytechnic and elementary agricultural school. Stanford University, with an endowment valued at twenty millions of dollars bears an important part in the educational work of the state and there are also many denominational colleges and preparatory schools which unite in making the school system of California the equal of that of any other state in the union.

The wealth of the state, as ascertained for purposes of taxation for the year 1906, is as follows:

Assessed value of real estate other than city and town lots.....	\$416,238,889
City and town lots.....	502,934,230
Total real estate.....	\$919,173,119
Assessed value of improvements on other than city and town lots	\$ 87,613,284
City and town lots.....	238,242,091
Total value of improvements..	\$325,855,375
Total value of all real estate and improvements thereon .....	\$1,245,028,494
Assessed value of personal property, other than money and solvent credits.....	237,929,012
Money and solvent credits.....	31,929,084
Assessment of railroads within state.....	81,010,821
Total assessed valuation of all property.....	\$1,595,897,411

The Forestry interests of California are very important. The entire stand of merchantable forests originally amounted to about 17,000,000 acres, but  $\frac{2}{3}$  of this has been cut over, at least in part, leaving only about 6,000,000 acres as yet untouched. Most of the cut over areas are capable of being speedily reforested, a work to which the general government, as well as the State of California is now addressing itself. The U. States government has withdrawn from sale about 20,000,000 acres of lands either forested or susceptible of becoming forested, which has been set apart as forest reserves or national parks.

The gold mines of California still yield about \$20,000,000 a year in gold, silver and platinum and the tendency



is to increase rather than diminish the yield.

The manufacturing interests of California are steadily developing. Census Bulletin 49, issued by the U. States department of commerce and labor, gives the following figures for manufactures in California:

Between 1900 and 1905, the number of manufacturing establishments increased .369 per cent and now total 6,839. The capital invested increased .611 per cent and now totals \$282,647,201.00. The value of the product increased .427 per cent and now totals \$367,218,494.00. The number of wage earners increased 30 per cent and totals 100,355. The total wages increased .621 per cent and for the year 1905 amounted to \$64,850,686.00. This development is largely the result of the discovery of petroleum, of which California is now a larger producer than any other state in the Union, and the development of electrical power through the utilization of the streams flowing down from the higher altitudes of the Sierra Nevada mountains.

California's fruit and fruit products are annually sufficient to load from 75,000 to 85,000 ten-ton freight cars, and this product is shipped to nearly all of the markets of the world. The canning industry now ranks first among the manufacturing interests of the state. The wool industry adds about 20,000,000 pounds of wool per year to the country's wool supply. The development of the open door in Asia and trade with the Philippine Islands affords a ready market for every pound of agricultural products at remunerative prices.

Ocean steamers run regularly between San Francisco and Australia, Panama, Mexico, China and Japan.

California has 19 railroads, having a total mileage of 5,489 miles, not counting electrical lines, of which there are about a thousand miles of road in the state, including the state railways. The total assessed value of these railroads for purposes of taxation, including Pullman Car Company's rolling stock is \$81,010,821.00. There are already 4 trans-continental lines and a fifth line is building and will be completed within two or three years. There are also three other great railroad companies that are heading toward California and it is not improbable that the close of the present decade will witness the completion of at least two of these to a termination at San Francisco Bay.

The principal city and port is San Francisco, the capital is Sacramento. Of the other cities the most important are Oakland and Los Angeles.

California is a very prosperous and growing commonwealth and notwithstanding the great catastrophe of April 18, 1906, which resulted in the destruction of property having an assessed value of \$150,000,000.00, the assessed valuation for the entire state for 1906 is only about \$39,000,000.00 less than for 1905. The general prosperity has come so near to making good the destruction of property by the great San Francisco fire of 1906. Pop. 1900, about 1,800,000.

**CALIFORNIA**, Gulf of, a gulf on the w. coast of N. America, in Mexico, lying between the peninsula of Lower California and the mainland. It is about 700 miles long, and, through most of its length, is less than 100 miles wide. It has long had a pearl fishery.

**CALIFORNIA**, Lower, a territory of Mexico, comprising a peninsula jutting into the Pacific Ocean, and separated from the mainland throughout its entire length by the Gulf of California. It is nearly 800 miles in length, and in different places 30, 60, 90, and 120 miles wide; area 61,562 sq. miles. It is largely mountainous and arid, but is said to possess valuable agricultural and mineral resources. The chief towns are Loretto and La Paz, the capital. Pop. 47,082, of whom perhaps a half are Indians.

**CALIG'ULA**, Caius Cæsar Augustus Germanicus, Roman emperor, son of Germanicus and Agrippina, was born A.D. 12, in the camp at Antium; assassinated by conspirators A.D. 41. He



Caligula.

received from the soldiers the surname of Caligula, on account of his wearing the caligæ, a kind of boots in use among them. He succeeded Tiberius, A.D. 37, and made himself very popular by his mildness and ostentatious generosity; but at the end of eight months he was seized with a disorder, caused by his irregular mode of living, which appears to have permanently deranged his intellect. After his recovery, he suddenly showed himself the most cruel and unnatural of tyrants—a monster of debauchery and prodigality, a perpetrator of the greatest crimes and follies. The most exquisite tortures inflicted on the innocent served him for enjoyments. In the madness of his arrogance he even considered himself a god, and caused sacrifices to be offered to himself. One of his greatest follies was the building of a bridge between Baïæ and Puteoli (Pozzuoli), in order that he might be able to boast of marching over the sea on dry land. He projected expeditions to Gaul, Germany and Britain, and having reached the sea, he bade his soldiers gather shells for spoils, and then led them back to Rome. At last a band of conspirators put an end to his career in the 29th year of his age.

**CAL'IPER COMPASSES**, compasses made either with arched legs to measure the diameters of cylinders or globular bodies, or with straight legs and retracted points to measure the interior diameter or bore of anything.

**CAL'IPH, CALIF, or KHALIF** is the name assumed by the successors of Mohammed in the government of the faithful and in the high-priesthood. Caliphate is therefore the name given to the empire of these princes which the Arabs founded in Asia, and enlarged, within a few centuries, to a dominion, exceeding even the Roman empire in extent. The appellation of caliph has long ago been swallowed up in Shah, Sultan, Emir, and other titles peculiar to the East.

**CALISTHEN'ICS**, a less correct spelling of Callisthenics. (Which see.)

**CALIX'TUS**, the name of three popes. —Calixtus I. was a Roman bishop from 217 to 224, when he suffered martyrdom. Calixtus II. was elected in 1119, in the monastery of Clugny, successor of the expelled pope, Gelasius II., who had been driven from Italy by the Emperor Henry V., and had died in this monastery. He excommunicated the Emperor Henry V. on account of a dispute respecting the right of investiture; as also the anti-pope Gregory VIII., whom he drove from Rome. He availed himself of the troubles of the emperor to force him, in 1122, to agree to the Concordat of Worms. He died in 1124. —Calixtus III., chosen in 1168 in Rome, as anti-pope to Paschal III., and confirmed by the Emperor Frederick I., in 1178, was obliged to submit to Pope Alexander III. As he was not counted among the legal popes, a subsequent pope, Alfonso Borgia, made pope in 1455, was called Calixtus III. He died in 1458.

**CALLAO** (kál-yä'ō), a seaport town of Peru, the port of Lima, from which it is 6 miles distant, and with which it is connected by a railway; pop. 60,000. Callao is the emporium of the whole of the trade of Peru, importing manufactured goods, and exporting guano, copper ore, cubic nitre, wool, bark, etc. In 1746 the old town was destroyed by an earthquake, with much loss of life and damage to shipping.

**CAL'LIPERS**. See Calliper Compasses.

**CALISTHEN'ICS**, the art or practice of exercising the body for the purpose of giving strength to the muscles and grace to the carriage. The term is usually applied to the physical exercises of females, as gymnastics is to those of males.

**CALLOS'ITY**, any thickened or hardened part of the human skin caused by pressure and friction. Also the natural cutaneous thickenings on the buttocks of monkeys.

**CAL'LUS**, a callosity; also a new growth of osseous matter between the extremities of fractured bones, serving to unite them.

**CALMS**, Regions of, tracts in the Atlantic and Pacific Oceans, on the confines of the trade-winds, where calms of long duration prevail. About the winter solstice their average northern limit is in 5° n. lat., and in the months about the summer solstice about 12° n. lat. The southern limit lies nearly always to the north of the equator, varying between 1° and 3° n. lat.

**CAL'OMEL**, mercurous chloride; a preparation of mercury much used in



medicine, and also found native as horn-quicksilver. It is prepared by grinding in a mortar sulphate of mercury with as much mercury as it already contains, and heating the compound which is formed with common salt in a retort until the mercury sublimes. The calomel is thus produced as a white powder. It is used in a variety of ailments, as a purgative, a vermifuge, etc.

**CALORES'CENCE**, the transmutation of heat rays into light rays; a peculiar transmutation of the invisible calorific rays, observable beyond the red rays of the spectrum of solar and electric light, into visible luminous rays, by passing them through a solution of iodine in bisulphide of carbon, which intercepts the luminous rays and transmits the calorific. The latter, when brought to a focus, produce a heat strong enough to ignite combustible substances, and to heat up metals to incandescence; the less refrangible calorific rays being converted into rays of higher refrangibility, whereby they become luminous.

**CALORIM'ETER**, an apparatus for measuring absolute quantities of heat or the specific or latent heat of bodies, as an instrument for measuring the heat given out by a body in cooling from the quantity of ice it melts or from the rise of temperature it produces in water around it.

**CALTANISSET'TA**, a town, Sicily, capital of the province of the same name, on the right bank of the Salso, 62 miles s. e. of Palermo. In the vicinity are springs of petroleum and of hydrogen gas, a mud-volcano, and important sulphur mines. Pop. 44,600.—The province has an area of 1445 sq. miles, with a pop. of 330,972.

**CAL'UMET**, a kind of pipe used by the American Indians for smoking tobacco. Its bowl is usually of soft red soapstone, and the tube a long reed, ornamented with feathers. The calumet is (or was) used as a symbol or instrument of peace and war. To accept the calumet is to agree to the terms of peace, and to refuse it is to reject them. The calumet of peace is used to seal or ratify contracts and alliances, to receive strangers kindly, and to travel with safety. The calumet of war, differently made, is used to proclaim war.

**CALVADOS** (kál-vá-dos), a French dep., part of the old province of Normandy, bounded on the n. by the English Channel, and e. w. and s. by the depts. Eure, La Manche, and Orne. Area, 2145 sq. miles. It is named from a dangerous ridge of rocks which extends along the coast for 10 or 12 miles. The dep. is undulating and picturesque, and possesses rich pastures. Chief town, Caen. Pop. 410,178.

**CAL'VARY**, applied to the place outside Jerusalem where Christ was crucified, usually identified with a small eminence on the north side of the city. The term is also applied in Roman Catholic countries to a kind of chapel, sometimes erected on a hill near a city and sometimes on the exterior of a church, as a place of devotion, in memory of the place where our Savior suffered; as also to a rocky mound or hill on which three crosses are erected, an adjunct to religious houses.

**CALVIN**, John, reformer and Protestant theological writer, born at Noyon, in Picardy, 1509, died at Geneva 1564. He went to Paris and entered on a course of regular study. He became dissatisfied with the teaching of the Roman Catholic Church; in consequence he gave up his cure, and took to the study of the law in Orleans. In 1532 he returned to Paris a decided convert to the reformed faith, and was soon compelled to fly, when, after various wanderings, he found a protector in Margaret of Navarre. In 1534 he returned to Paris; but, finding that the persecution against those who were inclined to the doctrines of the reformers was still raging, he retired to Basel in the autumn of the same year. At Basel he completed and published his great work, *The Institutes of the Christian Religion*. In 1538 he was expelled from Geneva. Here he married a widow, Idelette de Burie, and had one son, who died early. In 1541 his friends in Geneva succeeded in effecting his recall, when he laid before the council the draft of his ordinances respecting church discipline, which were immediately accepted and published. Michael Servetus, passing through Geneva in 1553, was arrested, and through Calvin's instrumentality was burnt alive because he had attacked the mystery of the Trinity in a book which was neither written nor printed at Geneva. This has been regarded as the great blot on Calvin's career, though approved of by many others of the reformers. His energy and industry were enormous: he preached almost daily, delivered theological lectures three times a week, attended all deliberations of the consistory, all sittings of the association of ministers, and was the soul of all the councils. He was consulted, too, upon points of law as well as of theology. Besides this, he found time to attend to political affairs in the name of the Republic, to publish a multitude of writings in defense of his opinions, and to maintain a correspondence through all Europe. Up to 1561 the Lutherans and the Calvinists were as one, but in that year the latter expressly rejected the tenth article of the Confession of Augsburg, besides some others, and hence arose the name of Calvinists. Calvin retained his personal influence to the last; but a year or two before his death his health had broken down. As a theologian Calvin was equal to any of his contemporaries in profound knowledge, acuteness of mind, and in the art of making good a point in question. As an author he merits great praise. His Latin works are written with much method, dignity, and correctness. He was also a great jurist and an able politician.

**CALVINISM**, the theological tenets or doctrines of John Calvin, including a belief in predestination, election, total depravity, original sin, effectual calling, and the final perseverance of the saints. The system also includes several other points of controversy, such as that of free-will, the Sonship of the Second Person of the Trinity, and other differences in doctrine as between Calvinists and Arminians. Calvinism is the theological system expounded in the West-

minster Confession of Faith, and is therefore the faith officially held by the Presbyterian churches generally; it is also substantially identical with what is known as "evangelicalism" in any of the churches or religious bodies.

**CAL'YDON**, an ancient city of northern Greece, in Ætolia, celebrated in Greek mythology on account of the ravages of a terrible boar. All the princes of the age assembled at the famous Hunt of the Calydonian Boar, which was finally despatched by Meleager.

**CALYP'SO**, in Greek mythology, a nymph who inhabited the island Ogygia, on the shores of which Ulysses was shipwrecked. She promised him immortality if he would consent to marry her but after a seven year's stay she was ordered by the gods to permit his departure.

**CALYP'TRA**, the hood of the theca or capsule of mosses. The same name is



Calyptra

a, Moss. b, Capsule with calyptra. c, Do, with calyptra removed.

given to any hood-like body connected with the organs of fructification in flowering plants.

**CA'LYX**, in botany, the name given to the exterior covering of a flower, that is, the floral envelope consisting of a circle or whorl of leaves external to the corolla, which it incloses and supports. The parts or leaves which belong to it are called sepals; they may be united by their margins, or distinct, and are



Forms of calyx.

usually of a green color and of less delicate texture than the corolla. In many flowers, however, there is little or no difference in character between calyx and corolla, in which case the whole gets the name of perianth. When the calyx leaves are distinct the calyx is called polysepalous (aaa in accompanying



cut); when united, gamosepalous or monosepalous (b b).

**CAM**, in machinery, a simple contrivance for converting a uniform rotatory motion into a varied rectilinear motion, usually a projecting part of a wheel or other revolving piece so placed as to give an alternating or varying motion to another piece that comes in contact with it and is free to move only in a certain direction.

**CAMBACERES** (kām-bā-sā-rā), Jean Jacques Régis de, Duke of Parma, born in 1753 at Montpellier; died at Paris, 1824. He was trained a lawyer, and by his talents soon attracted the notice of the Convention, and was appointed to various judicial offices. In the discussion relative to the fate of the king he declared Louis guilty, but disputed the right of the Convention to judge him, and voted for his provisory arrest, and in case of a hostile invasion, death. For a time he had the management of foreign affairs; and when Bonaparte was first consul, Cambacérès was chosen second. After the establishment of the empire, Cambacérès was created arch-chancellor, grand officer of the Legion of Honor, and ultimately Duke of Parma. He was banished on the second restoration of Louis XVIII., but was subsequently permitted to return.

**CAM'BAY**, a feudatory state in India, Bombay Presidenciy; lying at the head of the gulf of the same name in the western part of Gujarat. Area, 350 sq. miles; pop. 89,722. Also, chief town of above state, situated at the head of the Gulf of Cambay, formerly a flourishing port, but now decayed. Pop. 31,390.—The gulf separates the peninsula of Kathiawar from the northern coast of Bombay, having a length of about 80 miles, and an average breadth of 25 miles.

**CAMBO'DIA**, or **CAMBO'JA**, a country in the Indo-Chinese peninsula, bounded n. by Siam, e. by Anam, s. by French Cochinchina and Gulf of Siam, and w. by Gulf of Siam. Pop. estimated at 1,500,000, partly Cambodians proper, partly Siamese, Annamese, etc.

**CAMBRIAN ROCKS**, in geology, an extensive series of gritstones, sandstones, conglomerates, slates, and shales, lying under the Lower Silurian beds, and above the Archæan, and divided into the Upper and Lower Cambrian. Many fossils occur in the series, including sponges, star-fishes, trilobites, brachiopods, lamellibranchs, pteropods, gasteropods, cephalopods, etc. They may be regarded as the bottom rocks of the Silurian system, and are well developed in N. Wales (hence the name), but can be recognized in many other regions.

**CAM'BRIC**, the name of a fine kind of linen which was originally manufactured principally at Cambria, in French Flanders, whence the name. It is also applied to a cotton fabric, which is very extensively manufactured in imitation of the true cambrie, and which is in reality a kind of muslin.

**CAM'BRIDGE** (kām'brij), an inland county of England, bounded by the counties of Lincoln, Northampton, Huntingdon, Bedford, Hertford, Essex, Suffolk, and Norfolk; area, 524,935 acres. The soil is diversified and gen-

erally fertile; a large part belongs to the fen country. The principal rivers are the Cam or Granta, and the Ouse. The county abounds in dairy farms, celebrated for the production of excellent butter and cheese. The county town is Cambridge; other towns are Ely, Wisbech, Newmarket, and March. Pop. 190,687.—Cambridge, the county town, is situated on the river Cam, 50 miles n. of London. It occupies a perfect level encompassed by the colleges, and their beautiful grounds and gardens, on both sides of the Cam. The town is supported mainly by the presence of the university; but has some manufactures. Pop. 38,393.

**CAMBRIDGE**, a city separated from Boston by the Charles River. It is well laid out, with fine broad streets and avenues, and many open spaces adorned with shrubs and trees. The most important institution it contains is Harvard University (which see). Though distinct from Boston it really forms part of it. Pop. 100,000. See Boston.

**CAMBRIDGE**, University of, one of the two great English universities, as old at least as the thirteenth century, situated in the above town. The following list contains the names of the colleges or distinct corporate bodies comprised in the university, with the time when each was founded:

1. St. Peter's College, or Peter House.....	1257
2. Clare College, formerly Clare Hall.....	1326
3. Pembroke College.....	1347
4. Gonville and Caius College.....	1348
5. Trinity Hall.....	1350
6. Corpus Christi College.....	1352
7. King's College.....	1441
8. Queen's College.....	1448
9. St. Catherine's College, or Catherine Hall.....	1473
10. Jesus College.....	1496
11. Christ's College.....	1505
12. St. John's College.....	1511
13. Magdalene College.....	1519
14. Trinity College.....	1546
15. Emmanuel College.....	1584
16. Sidney Sussex College.....	1598
17. Downing College.....	1800

There is also Selwyn College (or hostel), founded in 1882, for Church of England students. Each of the colleges is a separate corporation, which is governed by laws and usages of its own although subject to the paramount laws of the university. The university is composed of a chancellor, vice-chancellor, the masters or heads of colleges, fellows of colleges, and students, and is incorporated as a society for the study of all the liberal arts and sciences. The senate, which is composed of all who have taken the degree of Doctor or Master, is the great legislative assembly of the university. The chief executive power is vested in the chancellor, the high-steward, and the vice-chancellor, who is the head of some college. Two proctors superintend the discipline of all pupils. The number of undergraduate students is about 3000. There are over forty professors in the various departments. A botanic garden, an anatomical school, an observatory, and a valuable library containing more than 300,000 printed volumes, besides many manuscripts, are attached to the university. The museums and laboratories for the study of science are among the most complete in the country.

**CAMBY'SES**, (1) a Persian of noble blood, to whom King Astyages gave his

daughter Mandane in marriage. Astyages was dethroned by Cyrus, the offspring of this union. (2) The son of Cyrus the Great, and grandson of the preceding, became, after the death of his father, King of the Persians and Medes, B.C. 529. In the fifth year of his reign he invaded Egypt, conquering the whole kingdom within six months. But his expeditions against the Ammonites and Ethiopians having failed, his violent and vindictive nature broke out in cruel treatment of his subjects, his brother Smerdis and his own wife being among his victims. He died in 521 B.C.

**CAMDEN**, a town of New Jersey, on the left bank of the Delaware, and connected with Philadelphia, on the opposite side, by a steamboat service. There are manufactories of various kinds, foundries, saw-mills, etc. Pop. 100,000.

**CAMEL**, a genus of ruminant quadrupeds, characterized by the absence of horns; the possession of incisive, canine, and molar teeth; a fissure in the upper lip; a long and arched neck; one or two humps or protuberances on the back;



Bactrian camel.

a broad elastic foot ending in two small hoofs, which does not sink readily in the sand of the desert. The native country of the camel is said to extend from Morocco to China, within a zone of 900 or 1000 miles in breadth. The common camel, having two humps, is only found in the northern part of this region, and exclusively from the ancient Bactria, now Turkestan, to China. The dromedary, or single-hump camel, or Arabian camel, is found throughout the entire length of this zone, on its southern side, as far as Africa and India. The Bactrian species is the larger, more robust, and more fitted for carrying heavy burdens. The dromedary has been called the race-horse of its species. To people residing in the vicinity of the great deserts the camel is an invaluable mode of conveyance. It will travel three days under a load and five days under a rider without drinking. The stronger varieties carry from 700 to 1000 lbs. burden. The camel's power of enduring thirst is partly due to the peculiar structure of its stomach, to which are attached little pouches or water-cells, capable of straining off and storing up water for future use, when journeying across the desert. It can live on little food, and of the coarsest kind, leaves of trees, nettles, shrubs, twigs, etc. In this it is helped by the fact that its humps are mere accumulations of fat



(the back-bone of the animal being quite straight) and form a store upon which the system can draw when the outside supply is defective. Hence the camel-driver who is about to start on a journey takes care to see that the humps of his animal present a full and healthy appearance. Camels which carry heavy

one  $135^\circ$ , and the other two each  $67^\circ 30'$ . One of the two faces which contain the right angle is turned toward the object to be sketched. Rays falling in a straight line on this face, as from *f*, are totally reflected at *g* from the face *c b* to the next face at *h*, whence they are again totally reflected to the fourth face,



Figs. 1 and 2, Arabian camels and camel-driver. Fig. 3, Bactrian or two-humped camel.

burdens will do about 25 miles a day, those which are used for speed alone, from 60 to 90 miles a day. The camel is rather passive than docile, showing less intelligent co-operation with its master than the horse or elephant; but is very vindictive when injured. It lives from forty to fifty years. Its flesh is esteemed by the Arab and its milk is his common food. The hair of the camel serves in the East for making cloth for tents, carpets and wearing apparel. It is imported into European countries, for the manufacture of fine pencils for painting and for other purposes. The South American members of the family *Camelidæ* constitute the genus *Auchenia*, to which the llama and alpaca belong; they have no humps.

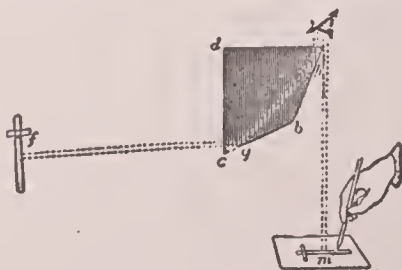
**CAMEL**, a water-tight box or caisson used to raise a sunken vessel, or to float a vessel over a shoal or bar. It is let down with water in it, and is attached to the vessel, after which the water is pumped out, and the camel rises from its buoyancy.

**CAMELLIA** (ka-mel'ya), a genus of plants, with showy flowers and elegant dark-green, shining, laurel-like leaves, nearly allied to the plants which yield tea.

**CAM'EO**, a general name for all gems cut in relief, in contradistinction to those hollowed out, or intaglios. More particularly, a cameo is a gem composed of several different-colored layers having a subject in relief cut upon one or more of the upper layers, an under layer of a different color forming the ground. For this purpose the ancients used the onyx, sardonyx, agate, etc. The shells of various molluscs are now much used for making cameos; and they are also imitated on glass.

**CAM'ERA LU'CIDA**, an optical instrument employed to facilitate the sketching of objects from nature by producing a reflected picture of them upon paper. Wollaston's apparatus is one of the commonest. The essential part is a totally-reflecting prism with four angles, one of which is  $90^\circ$ , the opposite

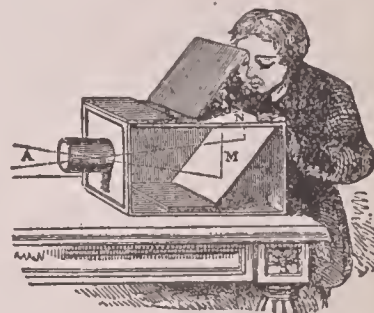
from which they emerge in a straight line. An eye (*e*) placed so as to receive the emergent rays, will see an image of the object in the direction *m*, and by placing the sketching paper below in this place, the image may be traced with a pencil. As the paper, for convenience of drawing, must be at a distance of about a foot, a concave lens, with a focal length of something less than a foot, is placed close in front of the prism in drawing distant objects. By raising or lowering the prism in its stand, the image of the object to be sketched may be made to coincide with the plane of the paper. The prism is mounted in such a way that it can be rotated either about a horizontal or a vertical axis; and its top is usually covered with a movable plate of blackened metal, having a semicircular notch at one edge, for the observer to look through. This form of camera has undergone various modifications. It is very convenient on account of its portability.



Camera lucida.

**CAM'ERA OBSCU'RA**, an optical instrument employed for exhibiting the images of objects in their forms and colors, so that they may be traced and a picture drawn, or may be represented by photography. A simple camera obscura is presented by a darkened chamber into which no light is permitted to enter excepting by a small hole in the window-shutter. A picture of the objects opposite the hole will then be seen on the wall, or on a white screen placed opposite the opening. A simple camera obscura is shown in the figure; the rays

of light passing through a convex lens at *A*, being reflected from the mirror *m* (which is at a slope of  $45^\circ$ ) to the glass plate *N*, where they form an image that may be traced. Another arrangement is a kind of tent surrounded by opaque curtains, and having at its top a revolving lantern, containing a lens with its axis horizontal, and a mirror placed behind it at a slope of  $45^\circ$ , to reflect the transmitted light downward on the paper. It is still better to combine lens and mirror in one by using a glass of peculiar shape, in which rays from external objects are first refracted at a convex surface, then totally reflected at the back of the lens, which is plane, and finally emerge through the bottom of the lens, which is concave, but with a larger radius of curvature than the first surface. The camera obscura employed by photographers is commonly a box, one half of which slides into the other, with a tube in front containing an object-glass at its extremity. At the back of the box is a slide of ground glass, on which the image of the object or objects to be depicted is thrown, in setting the instrument. The focussing is performed in the first place by sliding the one half of the box into the other, and by means of a pinion attached to the tube



Camera obscura.

in front which moves the lens. When the image has thus been rendered as sharp as possible, the ground-glass slide is removed, and a sensitized plate substituted, which not only receives, but retains the image.

**CAMERON**, Simon, an American statesman, born in Pennsylvania in 1799, died in 1889. In 1845 he became a United States senator, and was appointed by Lincoln to be secretary of war, a position which contributed the largest part to his reputation. After serving (1862-66) as minister to Russia he returned to the United States and used his influence for the second nomination of Lincoln. He was a strong opponent of civil service reform.

**CAMEROONS**, (1) a district on the West Coast of Africa, on the Bight of Biafra, now belonging to Germany, and one of the most suitable districts for colonization in this region. (2) A river in the Cameroons territory. It falls into a broad estuary, on approaching which it has a width of about 400 yards. There are several large and thriving towns (including King Bell's town) on the river, through which an extensive trade is carried on in ivory and palm-oil. (3) A mountain range in the territory, the highest peak of which has been estimated at over 13,000 feet. It is volcanic in character, and is clothed with



a dense growth of forest to the height of 4000 or 5000 ft.

**CAMIL' LUS**, Marcus Furius, a Roman patrician, famous as the deliverer of the city of Rome from the Gauls. In B.C. 396 he was made dictator during the Veientine war, and captured the town of Veii by mining, after it had defied the Roman power for ten years. In B.C. 394 Camillus besieged the Falerii, and by an act of generosity induced them to surrender. Three years after, Camillus was appointed dictator a second time, and was successful in repelling the invaders. After having been four times appointed dictator, a new invasion of the Gauls called Camillus, now eighty years old, again to the front, and for the fifth and last time, being appointed dictator, he defeated and dispersed the barbarians. He died in B.C. 365.

**CAM'OENS**, Luis de, the most celebrated poet of the Portuguese, born at Lisbon of a good family, probably in 1524 or 1525. An affray into which he was drawn was the cause of his embarking in 1553 for India. He landed at Goa, but, being unfavorably impressed with the life led by the ruling Portuguese there, wrote a satire which caused his banishment to Macao (1556). Here, however, he was appointed to an honorable position as administrator of the property of absentee and deceased Portuguese, and here, too, in what were the quietest and most prosperous years of his life, he wrote the earlier cantos of his great poem, the *Lusiads*. The *Lusiads* was printed at Lisbon (1572), and celebrating, as it did, the glories of the Portuguese conquests in India, acquired at once a wide popularity. The king himself accepted the dedication of the poem. He died on the 18th June, 1579. Fifteen years after his death a magnificent monument was erected to his memory, with an inscription on it which called him the prince of poets. The *Lusiads* is an epic poem in ten cantos. Its subject is the voyage of Vasco da Gama to the East Indies; but many other events in the history of Portugal are also introduced.

**CAMP**, the place and aggregate body of tents for soldiers in the field. Among the Greeks, the Lacedæmonians seem to have been the first who devoted attention to the art of forming military camps, adopting a circular form with the general's tent in the center; but the Romans, who had so often to carry on wars in distant and thinly-populated regions, were the first to carry the art of encampment to a high degree of perfection. Their camps as a rule were square, and were strongly intrenched so as to provide against the danger of surprise. Since the invention of gunpowder intrenched camps have become much more elaborate affairs and cover a much greater area. They may consist of intrenched areas permanently connected with and under the protection of fortified places; thus they are sometimes attached to certain large cities on the chief roads, partly in order to defend them against the first attack of the enemy, partly, to give to retreating armies rallying-points able to furnish support to numerous soldiers. Camps which, though intrenched, are to be

occupied merely for the period of a campaign, or which serve as a refuge for a few days only to a subordinate army, are termed "lines" or "temporary positions." From the perfection of modern artillery strong detached forts form the chief defensive feature of intrenched camps of the present day.

**CAMPAGNA DI ROMA** (kâm-pân'yâ), the coast region of Middle Italy, in which Rome is situated, from 30 to 40 miles wide and 100 long, and forming the undulating, mostly uncultivated plain which extends from near Civita Vecchia or Viterbo to Terracina, and includes the Pontine Marshes. The district is volcanic, and its lakes, Regillus, Albano, Nemi, etc., are evidently craters of extinct volcanoes. The soil is very fertile in the lower parts, though its cultivation is much neglected, owing to the malaria which makes residence there during midsummer very dangerous; and during the months of July, August, and September its inhabitants, chiefly herdsmen and peasants, seek refuge in Rome or the neighboring towns.

**CAMPAIGN** (kam-pân'), generally denotes the series of operations of an army during the time it keeps the field in one season or accomplishes a determinate object. Formerly campaigns lasted only during the warmer months, and were terminated by the troops retiring into winter quarters.

**CAMPA'NIA**, the ancient name of a province of Italy, in the former kingdom of Naples, which, on account of its beauty and fertility, was a favorite resort of wealthy Romans, who built there magnificent country houses. It comprises the modern provinces of Caserta, Naples, and parts of Salerno and Avellino. Cumæ (the oldest Greek settlement in Italy), Puteoli, Naples, Herculaneum, Pompeii, Baiæ, Stabiaz, Salernum, and Capua (its ancient capital) were the principal cities of Campania. Even now Campania is the most beautiful and fruitful part of Italy.

**CAMPBELL**, Alexander, an American religious minister, founder of the Disciples of Christ, widely known as Campbellites. Campbell was born in Ireland in 1788, and died in the U. States in 1866. The principle upon which he founded the new method of interpreting the Scriptures was based on the idea that where the Scriptures are silent the interpreter should be silent. The new method spread rapidly and now numbers nearly 2,000,000 adherents.

**CAMPBELL**, Bartley, an American dramatic writer, born in Pennsylvania in 1843, died 1888. He was early a journalist but left that profession for play-writing. His principal works are *Through Fire* and *My Partner*.

**CAMPBELL**, Thomas, a distinguished modern poet, was born at Glasgow 27th July, 1777, and educated at its university. After leaving the university he resided for a short time in Edinburgh; and all at once attained the zenith of his fame by publishing, in 1799, his *Pleasures of Hope*. In 1803, after spending some time in Germany, Campbell published an edition of the *Pleasures of Hope* with the addition of some of the finest lyrics in the English language, including *Hohenlinden*, *Ye Mariners of*

England, and the *Exile of Erin*. In 1809 he again made his appearance as a poet, and published *Gertrude of Wyoming*, *Lord Ullin's Daughter*, and the *Battle of the Baltic*. He died at Boulogne, 15th June, 1844, and was interred at Poet's Corner in Westminster Abbey, close to the tomb of Addison.

**CAMPBELL-BANNERMAN**, Sir Henry, a British statesman, premier of England. Was born in 1836. He has been financial secretary of the war office, admiralty secretary, chief secretary for Ireland, and secretary of state for war. In 1899 he became leader of the liberal party. In 1906 he became premier. He died in 1908.

**CAMPEACHY**, or **CAMPECHE** (kam'-pēchi, kam'pech-e), a seaport of Mexico, in the state and on the bay of the same name, on the w. coast of the peninsula of Yucatan, a mart for logwood and wax. Cigars are manufactured, and ships are built, though the harbor can only admit small vessels. Pop. 15,196. —The state of Campeachy has an area of 25,832 sq. miles; a pop. of 90,413.

**CAMP FOLLOWERS**, a term applied to servants, small merchants, purveyors, women, and others who follow an army while on the march. In former times these camp followers often exceeded in number the army itself, thus becoming a source of insurmountable difficulty to the commander. Their function, however, was very useful to the daily life of the soldiers.

**CAMPHENE** (kam'fēn), the generic name for the volatile oils or hydrocarbons, isomeric or polymeric with oil of turpentine, as oil of bergamot, cloves, copaiba, hops, juniper, orange, pepper, etc. They are liquid at ordinary temperatures, and are distinguished from each other by their odors.

**CAMPHINE** (kam'fēn), the commercial term for purified oil of turpentine, obtained by distilling the oil over quicklime to free it from resin. It is used in lamps, and gives a very brilliant light; but, to prevent smoking, the lamp must have a very strong draft. With oxygen it forms camphor.

**CAM'PHOR**, a whitish translucent substance, of a granular or foliated fracture, and somewhat unctuous to the



Camphor-tree.

touch, which is mostly extracted from two or three kinds of trees of the laurel tribe. It has a bitterish aromatic taste and a strong characteristic smell. In chemical character it belongs to the vegetable oils. The common camphor of the shops is obtained from the cam-







150° A B 140° C D 130° E F 120° G H 110° J K 100° L M 90° N O 80° P Q 70° R S 60° T U 50° V W 40° X Y 30°



DOMINION OF  
**CANADA**  
AND  
**NEWFOUNDLAND.**

SCALE OF STATUTE MILES.  
0 100 200 300  
KILOMETERS.  
0 100 200 300 400

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phor laurel, a native of China and Japan, now naturalized in many other countries. The camphor is chiefly prepared in the island of Formosa, though also exported from Japan, and to a small extent from China. The common camphor is obtained from the wood by distillation and sublimation. Borneo camphor, on the other hand, is not procured by distillation, but is found in masses, secreted naturally in cavities in the trunk and greater branches. Numerous other vegetables, such as thyme, rosemary, sage, etc., are found to yield camphor by distillation. In medicine camphor is used both as an external and internal stimulant. In small doses it acts as an anodyne and antispasmodic; in large doses it acts as a poison. Its effluvia being very noxious to insects, it is much used to protect specimens in natural history. It readily dissolves in alcohol, oils, etc., and in this way is much used as a liniment. It evaporates or volatilizes at ordinary temperatures. A third kind of camphor, blumea camphor, is prepared in China from *Blumea balsamifera*, a tall composite plant.

**CAMPI**, a family of Italian artists who founded what is known in painting as the school of Cremona. Of the four of this name, Giulio, Antonio, Vincenzo, and Bernardino, the first and last are the best known. Giulio (1502-72), the eldest and the teacher of the others, was a pupil of Giulio Romano, and acquired from the study of Titian and Pordenone a skill in coloring which gave the school its high place. Bernardino (1525-90), was the greatest of the school. He took Romano, Titian, Correggio in succession as his models, but without losing his own individuality as an artist.

**CAMP-MEETING**, religious gatherings held in the open air in which the audiences are addressed by prominent or able exhorters, scholars, entertaining lecturers, etc. They were originated in Kentucky by a Methodist and a Presbyterian preacher, two brothers named McGee. Camp-meetings are now held yearly in the summer by many methodist conferences, and are among the most cherished institutions of that church, although in England the church itself has refused them its countenance.

**CAMPOBASO**, a town of Italy, province of Campobasso, on a hill-slope, 52 miles n.e. Naples; has manufactures of cutlery, and a good trade. Pop. 14,818.—The prov. (formerly Molise) has an area of 1771 sq. miles; pop. 385,140.

**CAMPUS MARTIUS**, was a large place in the suburbs of ancient Rome, consisting of the level ground between the Quirinal, Capitoline, and Pincian hills, and the river Tiber, set apart for military exercises and sacred to the god Mars. In the later period of the republic it was a suburban pleasure-ground for the Romans, and was laid out with gardens, shady walks, baths, etc. A large part of the modern city stands on it.

**CANAAN** (kā'nān). See Palestine.  
**CANAANITES**, the general name for the heathen peoples (Jebusites, Hittites, Amorites, etc.) whom the Israelites

found dwelling in Canaan (Palestine) west of the Jordan, and whom latterly they utterly subdued, though the subjugation was not quite complete till Solomon's time. They are believed to have been, in part at least, of kindred race with the Israelites; and some authorities find traces of their descendants among the present inhabitants of Palestine.

**CANADA**, Dominion of, an extensive series of British territories in North America, the greatest of Britain's colonial possessions, comprising the provinces of Ontario (formerly Upper Canada), Quebec (formerly Lower Canada), Nova Scotia, New Brunswick, British Columbia, Prince Edward Island, and Manitoba, along with the vast regions in the north and northwest known as the Northwest Territories, and another vast region north of Quebec known as the Northeast Territory. The Dominion thus embraces the whole of British North America, with the exception of Newfoundland and part of Labrador (which belongs to Newfoundland), and its area, 3,729,620 sq. miles, is not much less than that of Europe.

The southern boundary is most remarkable for passing through the system of great lakes—Superior, Huron, Erie, and Ontario, between the last two of which are the Falls of Niagara, partly belonging to Canada, partly to the United States. To the Atlantic the drainage of these lakes is carried by the St. Lawrence, with which river, and the great gulf into which it expands, are connected the provinces of Ontario, Quebec, New Brunswick, Nova Scotia, and Prince Edward Island, together containing by far the greater portion of the population of the Dominion.

The chief mountain ranges of the east are north and south of the St. Lawrence, and run nearly parallel to that river. On the Pacific slope we have a distinctly mountainous region, including the Rockies, some peaks of which (Mt. Hooker, Mt. Brown) attain a height of about 16,000 feet, as also the Gold and the Cascade Ranges. In the prairie region and the northwest are great lake and river systems, formed by the Saskatchewan, Nelson, Churchill, Athabasca, and Mackenzie rivers, and the great lakes Winnipeg, Athabasca, Great Slave and Great Bear. The Saskatchewan, lying in the heart of the rich wheat-growing district, must in time prove a far more important waterway than at present. The Mackenzie and its connected lakes and rivers form the most remarkable feature of the far northwest. This river, including its tributary the Peace, has a length of perhaps 2500 miles, and drains an area of 550,000 sq. miles, or almost double that of the St. Lawrence basin. Between the Mackenzie system and Hudson Bay is a great region called from its desolate character the Barren Grounds.

Canada has great mineral wealth. Iron of the best quality has been found in great abundance in Quebec, Ontario, and British Columbia. The district round Lake Superior and the upper part of Lake Huron abounds in copper and has much silver as well; and Nova

Scotia, Assiniboia, Alberta, and British Columbia are rich in coal. In Nova Scotia there are a number of coal-mines worked; gold is also obtained in some quantity, as well as iron. Coal is worked in the northwest, and more extensively in British Columbia; but the most valuable mineral of the latter is gold. British Columbia is very rich in iron. Gold is also found in the Klondike region, near Alaska.

The chief wild animals (some of them represented by several species) are the deer, buffalo, musk-ox, bear, wolf, fox, otter, beaver, squirrel, raccoon, muskrat, marten, etc. The buffalo is now scarce, and will probably soon be exterminated. The largest of the deer kind is the moose, or elk, which is found in New Brunswick, Nova Scotia, and the northern parts of Quebec, as well as in the far west and northwest. The reindeer occurs in the north. The grizzly bear is met with in the Rocky Mountains, and the polar bear in the extreme north and northeast. Fur-bearing animals are so numerous as to have been a source of revenue to a large trading company like the Hudson Bay Co., for over two centuries. There are birds in great variety, Canada having more than 700 of these altogether. They include the wild swan, wild turkey, geese and ducks of various kinds, partridges, quail, prairie-fowl, pigeon, woodcock, snipe, plover, etc.; besides eagles, hawks, owls, and many smaller birds, among which are two species of humming-bird. Except at certain seasons game of all kinds may be shot at will. The rattle-snake and other snakes occur, but are less common than in the States. The seas, lakes, and rivers, especially the Gulf of St. Lawrence and the neighboring waters, abound in almost all kinds of fish, and the fisheries are extremely valuable, employing over 250,000 people. The chief sea fish caught are cod, herring, mackerel, halibut, haddock, hake, shad, salmon, etc. The rivers and lakes abound with salmon, white-fish, bass, trout, sturgeon, maskinonge (or maskelonge), pike, pickerel, etc. The seal and whale fisheries are also valuable. Lobsters and oysters are abundant and excellent.

In the forests grow more than sixty kinds of trees.

Generally the climate of the Dominion shows considerable extremes of heat and cold, but, except in some of the coast regions, the exceeding dryness of the Canadian atmosphere makes both extremes of temperature pleasant and healthy.

The chief crops are wheat, barley, oats, rye, pease, maize, buckwheat, potatoes, turnips, mangel-wurzel, etc. The breeds of cattle are now being much improved, partly by the introduction of high-class cattle; and cattle, horses, and sheep are exported.

The trade of the Dominion is chiefly with Great Britain and the United States. About four-fifths of the whole exports are sent to these two countries, while nearly nine-tenths of the imports come from them. Besides timber, animals and their produce, and agricultural products, the chief articles of export are fish, coal and other minerals,



leather, and wooden goods. The imports chiefly consist of manufactured goods, coal, iron, tea, coffee, sugar, cotton, etc. Canada grain and flour, timber, cattle, bacon and hams, cheese, butter, furs, and fish are exported to Great Britain and U. States.

Of the railways the greatest is the Canadian Pacific Railway, running from Montreal across the whole continent to Vancouver on the Pacific coast in British Columbia; length, about 2900 miles, exclusive of branches. The Grand Trunk Railway connects the maritime provinces and the North-eastern U. States with the western railways, running from Portland, Maine, to Sarnia on the Detroit River.

Some of the canals are stupendous achievements. The most important, from a commercial point of view, are the St. Lawrence Canals and the Welland Canal. The last Canadian canal necessary to complete the navigation of the St. Lawrence to Lake Superior is St. Mary's Canal, opened in 1895, avoiding the St. Mary rapids (Sault Ste. Marie), a tumultuous descent by which Lake Superior pours its waters into Lake Huron. Next after those mentioned, the most important of the Canadian canals is the series of locks and short artificial connections known as the Rideau Canal. It connects Lake Ontario at Kingston with the Ottawa near the city of that name. By means of these works large vessels can now sail by the St. Lawrence route from the Atlantic to the head of Lake Superior.

By the Act of Confederation of 1867 the constitution of the Dominion was required to be similar in principle to that of the United Kingdom. There is a central federal government and separate provincial governments and legislatures. The central executive government is vested in the sovereign of Great Britain and Ireland, and is carried on in his name by a governor general appointed by the crown, and a privy-council. The governor-general has a salary of \$50,000 per annum. He is assisted by a privy-council consisting of the prime-minister and twelve other ministers or heads of departments. The legislative authority rests with a Parliament consisting of two houses, the Senate and the House of Commons. The Senate consists of eighty-one members, nominated by the governor-general. The House of Commons is elected by the people for five years, there being one member for about every 22,000 of the population. Each of the provinces has a separate parliament and administration, independent in its own sphere, at the head being a lieutenant-governor appointed by the central government. The provinces of Quebec and Nova Scotia have each two chambers; the other provinces have only one. There is also a very perfect system of municipal government throughout the Dominion, the counties and townships having local governments or councils which regulate their local taxation. The administration of justice is based on the English model, except in Quebec province, where the old French law prevails. The only court that has jurisdiction throughout the Dominion (except the

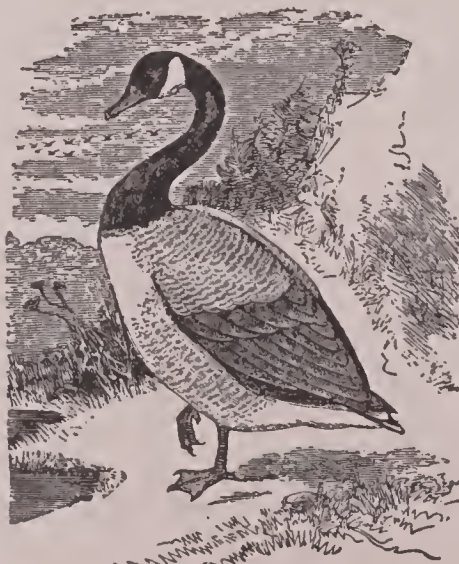
Exchequer and the Maritime Court), is the Supreme Court, the ultimate court of appeal in civil and criminal cases. In certain cases an appeal may be had to his Majesty's Privy Council. The capital of the Dominion is Ottawa, but the largest cities are Montreal, Toronto, and Quebec. Canada has both a large volunteer force and a militia. The former comprises many well-equipped organizations in infantry, cavalry, and artillery. A military college for the training of officers is maintained by the Dominion government at Kingston.

There is no state church in the Dominion. The prevailing religion in Quebec is that of the Roman Catholic Church. In Ontario Methodists predominate, then Presbyterians, the English Church, and the Roman Catholics. Of the total population in 1901, 2,229,600 were Roman Catholics, 916,886 Methodists, 842,442 Presbyterians, 680,620 Anglicans. Education is well attended to, being everywhere more or less under the supervision of government, and excellent free schools being provided.

The population is increasing rapidly both naturally and by means of immigration. Ontario is settled principally by emigrants from Great Britain and their descendants, with considerable numbers of Germans and Americans. In the province of Quebec the people are mostly French in origin, speech, and customs, being mainly descendants of the French colonists who inhabited the region before it became British. There are, besides, the Indian tribes and the Eskimos, the latter in the extreme north. The Indians number about 130,000. Population about 6,000,000.

**CANADA BALSAM**, a fluid oleo-resin obtained from the balsam-fir common in Canada and the U. States, and also from Fraser's balsam-fir and the hemlock spruce. It is used in medicine and in making varnishes, etc.

**CANADA GOOSE**, an American wild goose 30 to 35 inches long, brownish above, lighter below, head, neck, bill,



Canada goose, or wild goose.

and feet black, a white patch on the cheek; breeds in the north of the continent, and migrates southward when the frost becomes severe.

**CANADA HEMP**, a perennial herb, of the dogbane family, native of N. America. It has a strong fiber used for twine, nets, woven fabrics, etc.

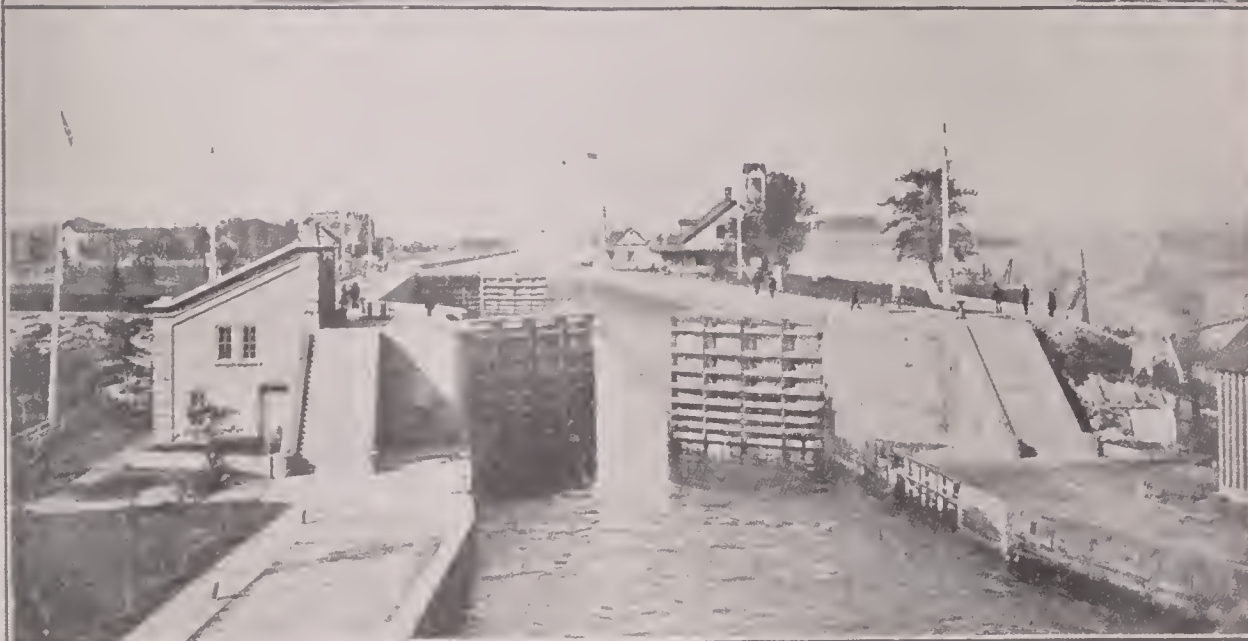
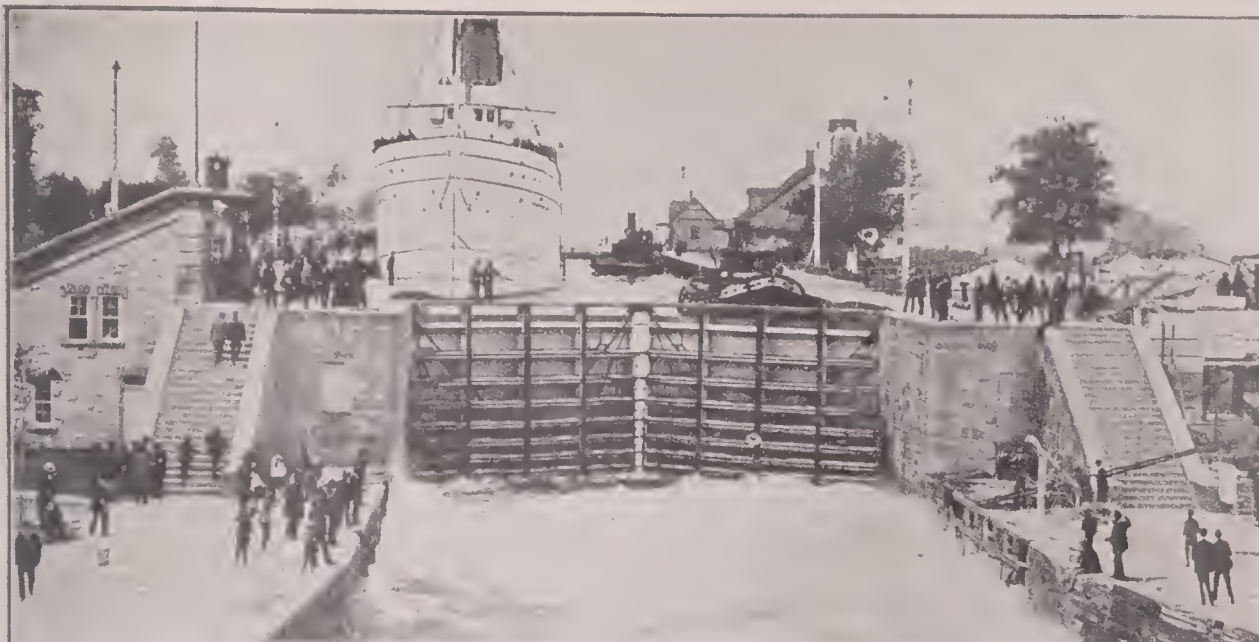
**CANADA RICE**, a floating grass growing in lakes and sluggish streams in Canada and the northern U. States, yielding a grain that forms part of the food of the Indians, and is eaten by whites also.

**CANAL**, an artificial water-course for the transportation of goods or passengers by boats or ships, or for purposes of drainage or irrigation. The canals most familiar to ordinary readers are for navigation. These consist usually of a number of different sections, each on one level throughout its course, but differing in relative height from the others. From one section to another boats are transferred by means of locks, or it may be by inclines or lifts. The lock is a water-tight inclosure with gates at either end, constructed between two successive sections of a canal. When a vessel is descending, water is let into the lock till it is on a level with the higher water, and thus permits the vessel to enter; the upper gates are then closed, and by the lower gates being gradually opened, the water in the lock falls to the level of the lower water, and the vessel passes out. In ascending the operation is reversed. The incline conveys the vessel from one reach to another, generally on a specially-constructed carriage running on rails, by means of drums and cables. The lift consists of two counterbalancing troughs, one going up as the other descends, carrying the vessel from the higher to the lower level, or vice versa. Works of great magnitude in the way of cuttings, embankments, aqueducts, bridges, tunnels, reservoirs for water-supply, etc., are often necessary in constructing canals. Canals have been known from remote times, Egypt being intersected at an early period by canals branching off from the Nile to distant parts of the country, for purposes of irrigation and navigation.

The chief canal in Germany is the great North Sea and Baltic Canal for sea-going vessels, constructed at a cost of \$40,000,000, starting near the mouth of the Elbe and reaching the Baltic near Kiel. The greatest British canal is the Manchester Canal, a waterway for ocean-going vessels from the estuary of the Mersey, near Runcorn, to Manchester, through a few locks and partly in the beds of the Mersey and the Irwell, begun in 1887, opened in 1894; total cost, about \$75,000,000. In the U. States the most extensive undertakings of this kind are the canal connecting the Hudson with Lake Erie and the Chicago drainage canal. In Canada, besides the Welland Canal, uniting Lakes Erie and Ontario, and avoiding the Niagara river and its falls, there are several other important canals. As yet the greatest achievement in canal-making has been the Suez Canal. It is an example of a ship-canal without locks, open at both ends to the sea. A similar but much smaller canal is that of Corinth. Two great American canals, the Panama Canal and the Nicaragua Canal—the one of very different character from the



# CANAL



VIEWS OF THE SAULT SAINTE MARIE CANAL

The Weitzel Lock Emptying (Upper)    The Weitzel Lock Empty (Center)    The Poe Lock Empty (Lower)







other—remain as yet uncompleted. See separate articles.

**CANAL**, Chicago drainage, for the removal of Chicago's sewage was begun Sept. 3, 1892, and opened Jan. 2, 1900. Some sections are excavated in solid rock, are 160 ft. wide, with perpendicular walls, and 30 to 35 ft. deep. Where it is full earth-cut the bottom of the channel is 202 ft. wide. The full length of the channel is 28½ mi. Its capacity per minute is 600,000 cubic ft; maximum velocity of current per hour, 3 mi.; length of spillway, 397 ft. The total cost of construction was about \$33,000,000.

**CAN'ARA**, a maritime region of Hindustan, now partly in the Madras presidency (south Canara), and partly in the Bombay presidency (north Canara), extending along the Indian Ocean for 180 miles, with a mean breadth of 40 miles. The Bombay portion has an area of 3910 sq. miles and a pop. of 446,351; the Madras portion 3902 sq. miles and 1,056,081 inhabitants.

**CANA'RY**, a wine not unlike Madeira, made in the Canary Islands, chiefly at Teneriffe.

**CANARY-BIRD**, an insectorial singing bird, a kind of finch from the Canary Islands. Many of the cage canaries are really mules, produced by the interbreeding of canaries with allied species, such as the goldfinch, siskin, linnnet, etc.

**CANARY, GRAND**, or **GRAN CANARIA**, an island in the Atlantic Ocean, about 180 miles from the coast of Africa. It is the most fertile and important of the Canary Islands, to which it gives name. Area, 650 sq. miles; pop. 93,653. Canary, or Cividat de Palmas, is the capital.

**CANA'RY ISLANDS**, or **CANARIES**, a cluster of islands in the Atlantic, 60 or 70 miles from the n.w. coast of Africa, and belonging to Spain. They are thirteen in number, seven of which are considerable, viz.: Palma, Ferro, Gomera, Teneriffe, Grand Canary, Fuerteventura, and Lancerota. The other six are very small: Graciosa, Roca or Rocca, Allegranza, Sta. Clara, Inferno, and Lobos. All are volcanic, rugged and mountainous, frequently presenting precipitous cliffs to the sea. The principal peak is that of Teneriffe, 12,182 feet; El Cumbre in Gran Canaria is 6650 feet. The area of the whole has been estimated at 2808 sq. miles. Their fine climate and their fertility, which owes little to cultivation, justified their ancient name of Fortunate Islands. The Canaries form a Spanish province; pop. 358,564.

**CANARY-SEED**, the seed of the canary-grass, order Gramineæ, is used as food in the Canaries, Barbary, and Italy, and is largely collected for canary-birds.

**CANA'RY-WOOD**, the light orange-colored wood of trees of the laurel family belonging to the Canaries and Madeira.

**CANBY**, Edward Richard Sprigg, an American soldier, born in Kentucky in 1819, died in 1873. He graduated at West Point, served in the Indian and Mexican wars, and during the civil war repelled the attacks of Sibley on New Mexico. In 1873 he was killed by

the treachery of the Modoc Indians in Oregon.

**CANCER**, in astronomy, the fourth sign in the zodiac, entered by the sun on or about the 21st of June, and quitted about the 22d of July. The constellation Cancer is no longer in the sign of Cancer, but at present occupies the place of the sign Leo.

**CANCER**, or **CARCINO'MA**, a malignant growth or structure in some part of the human body, which can extend itself and spread to neighboring parts, and even form again after removal, and usually causes death. Cancer is often a very painful disease, but in many cases is not attended with pain. No cure for it can be said to exist, though excision, if performed in time, may not be followed by a recurrence.

**CANCER**, Tropic of. See Tropics.

**CANDAHAR**. See Kandahar.

**CANDELA'BRUM**, an ornamental candlestick or lamp-holder, often of a branched form. Ancient candelabra frequently display much ingenious treatment in the design, presenting columns, figures, etc., and the branches from the central shaft were often numerous. In ancient times Tarentum and Ægina were famous for their elegant candelabra. Marble, earthenware, and other materials, as well as metal, were employed in their structure, which was sometimes on a large scale.

**CAN'DIA**, one of the most important islands of the Turkish Empire, situated in the Mediterranean, 81 miles from the southern extremity of the Morea and 230 miles from the African coast, 160 miles long, 14 to 50 broad; area, 4026 sq. miles. The inhabitants (estimated at 1,200,000 in ancient times) now number about 309,349, of whom 269,246 are Greek Christians (rapidly increasing), and 38,281 Mahometans. The capital, Canea, the seat of the governor and chief place of trade, has 24,537 inhabitants; Candia, 22,774.

**CAN'DIDATE**, a term taken from the Latin candidatus, a candidate, literally a person dressed in white, because, among the Romans, a man who solicited an office, such as the prætorship or consulship, appeared in a bright white garment—toga candida.

**CANDLE**, a solid cylindrical rod of some fatty substance, with a small bundle of loosely-twisted threads placed longitudinally in its center, used for a portable light. The chief material used for making candles is tallow, either in a pure state or in mixture with other fatty substances, as palm-oil, spermaceti, wax, etc. Paraffin candles are now made in considerable quantities also. Ordinarily tallow candles are either dipped or moulded. The former, generally composed of the coarser tallow, are made by attaching a number of separate wicks to a frame and dipping the whole into a cistern of melted tallow as often as may be necessary to give the candle the required thickness. Moulded candles, as their name implies, are formed in moulds. These, made generally of pewter, are hollow cylinders of the length of the candle, and open at both ends, but provided at the upper end with a conical cap, in which there is a hole for the wick. A number of these

moulds are inserted in a wooden frame or trough with their heads downward; the wick is then drawn in through the top hole by means of a wire, and kept stretched while the moulds are filled by running melted tallow from a boiler into the trough. Considerable modern improvements have been made in the manufacture of candles. One of the most important of these consists in not employing the whole of the fatty or oily substances, but in decomposing them, and then using only the stearine of the former and the palmitine of the latter class of substances. Wax cannot be formed into candles by melting it and then running it into moulds. Instead, the wicks, properly cut and twisted, are suspended by a ring over a basin of liquid wax, which is poured on the tops of the wicks until a sufficient thickness is obtained, when the candles, still hot, are placed on a smooth walnut table, kept constantly wet, and rolled upon it by means of a flat piece of boxwood. The large wax candles used in Roman Catholic churches are merely plates of wax bent round a wick and then rolled.

**CANDLEBERRY**, Candleberry Myrtle, Wax Myrtle, etc., a shrub growing from 4 to 18 feet high, and common in N. America, where candles are made from its drupes or berries, which are about the



Candleberry or wax myrtle.

size of peppercorns, and covered with a greenish-white wax popularly known as Blayberry tallow. The wax is collected by boiling the drupes in water and skimming off the surface. A bushel of berries yields from 4 to 5 lbs. of wax.

**CANDLE-FISH**, a sea-fish of the salmon family, frequenting the north-western shores of America, of about the size of the smelt. It is converted by the Indians into a candle simply by passing the pith of a rush or a strip of the bark of the cypress-tree through it as a wick, when its extreme oiliness keeps the wick blazing.

**CAN'DLEMAS**, a church feast, instituted in 492 in commemoration of the presentation of Christ in the temple and of the purification of Mary. It falls on February 2, and on this day among Roman Catholics lighted candles are carried about in procession, and all candles and tapers which are to be used in the churches during the entire year are consecrated.

**CANE**. See Bamboo, Rattan, Sugar-cane.

**CANEBRAKE**, a reed or grass, indigenous to the warmer parts of the U. States. It grows in marshy situations,



where it attains a height of 10 to 30 feet. It is of a genus allied to the bamboo. The flowers are in panicles. The young growth of this cane is used as fodder, but the quality is rather poor. The stems supply fishing-rods, pipe-stems, splints for baskets, chair-bottoms, mats, etc.

**CANE'PHORUS**, one of the bearers of the baskets containing the implements of sacrifice in the processions of the Dionysia, Panathenea, and other ancient Grecian festivals an office of honor



Canephorus, from terra cotta in British Museum.

much coveted by the virgins of antiquity. The term is applied to architectural figures bearing baskets on their head, sometimes improperly confounded with Caryatides.

**CAN'IDÆ**, the dog family of animals.

**CANIS MAJOR**, a constellation of the southern hemisphere, remarkable as containing Sirius, the brightest star.—**Canis Minor**, is a constellation in the northern hemisphere, immediately above Canis Major, the chief star in which is Procyon.

**CANISTER SHOT**. Same as Case-shot.

**CANKER**, (1) in medicine, a collection of small sloughing ulcers in the mouth, especially of children; called also water canker. (2) In horticulture, a kind of gangrenous disease to which fruit-trees especially are liable, beginning in the younger shoots and gradually extending to the trunk. (3) In farriery, a disease in horses' feet causing a discharge of fetid matter from the cleft in the middle of the frog, generally originating in a diseased thrush.

**CANKER-WORM**, a worm or larva destructive to trees or plants; in America specifically applied to moths.

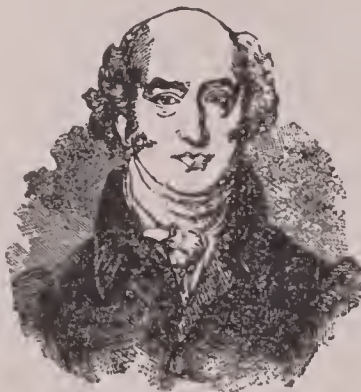
**CANNA**, a genus of plants, order Marantaceæ, some species of which have fine flowers, and some from their black, hard, heavy seeds are called Indian shot.

**CANNEL COAL**. See Coal.

**CANNES** (kân), a seaport of France, on the shore of the Mediterranean, dep. Alpes-Maritimes; famous as a winter residence, and as the place where Napoleon landed when he returned from Elba, March 1, 1815. Pop. 34,151.

**CANNIBALISM**, or **ANTHROPOPHAGY**, the eating of human flesh as food, a practice that has been known from the earliest times, and in the most widely spread localities. See Anthropophagi.

**CANNING**, Charles John, Earl, son of George Canning, born in 1812; educated at Eton and Oxford, and in 1856 went out to India as governor-general. Throughout the mutiny he showed a fine coolness and clear-headedness, and though his carefully-pondered decisions were sometimes lacking in promptness, yet his admirable moderation did much to re-establish the British Empire in India. He was raised to the rank of earl and made viceroy, but returned to England with shattered health in 1862, dying in the same year.—**CANNING**, George, a distinguished orator and statesman, born in London in 1770; educated at Eton and at Oxford. He



George Canning.

was first brought into parliament by Pitt in 1793, and in 1796 became under-secretary of state. In 1814 he was appointed minister to Portugal, and remained abroad about two years. He refused to take any part in the proceedings against the queen, and in 1822, having been nominated governor-general of India, he was on the point of embarking when the death of Castlereagh called him to the cabinet as foreign secretary.—**CANNING**, Stratford, Viscount Stratford de Redcliffe, an English diplomatist, son of a London merchant and cousin of George Canning, born in 1788. He retired from diplomatic work in 1858, but exercised no small influence in the House of Lords, and as late as 1880 drew up a paper on the Greek claims. He died in the August of that year, having done more than any one man to establish British prestige in the East.

**CANNON**, a big gun or piece of ordnance. The precise period at which engines for projecting missiles by mechanical force (catapults, etc.) were supplanted by those utilizing explosive materials is a matter of controversy, the invention of cannon being even attributed to the Chinese, from whom the Saracens may have acquired the knowledge. A doubtful authority asserts their use at the siege of Belgrade in 1073; but they were certainly brought into use in France as early as 1338.

Great improvements and changes in the manufacture of cannon have been introduced in recent times. Those that are now made of bronze have often their bore widened by strong cylinders of steel successively forced into them, a process which condenses and hardens the surrounding bronze, giving it a tenacity approaching that of cast-steel.

The heavy guns of the British service, made on the "Woolwich" system, have a steel tube to form the bore, over which are shrunk coils of wrought iron, increasing in thickness about the breech. This method of manufacture was first introduced by Sir W. (later Lord) Armstrong about 1858. This construction presents the hard steel to meet the wear and tear on the bore of the gun, while great support is given by shrinking on the wrought-iron hoops, which contract with a tight grip upon the steel. In the U. States enormous cast-iron smooth-bore guns have been made on the Rodman system, throwing very heavy spherical projectiles at a low velocity, intended by their great weight to bend and open armor at the joints, thus destroying the vessel by what is termed "racking." But the common system is to punch holes in the armor by means of rather smaller projectiles, made of chilled iron, which strike at a high velocity, and the range and penetration of modern ordnance are something enormous. Thus some of the larger guns are sighted for 5 miles, and they can penetrate 30 inches of armor at the distance of 1000 yards. Eighty-ton, 100-ton, and 110-ton guns have been constructed for the navy and land defenses.

Rifled cannon load either at the muzzle or breech. The former system is simpler and stronger. The latter facilitates loading and exposes the gunners less to the fire of the enemy's riflemen, especially when the gun is firing through a ship's port or the embrasure of a fort. The projectiles for rifled guns are not spherical, but elongated, their length being perhaps  $2\frac{1}{2}$  or 3 times their diameter; and they require to be so constructed that they may take hold of the grooves of the bore and thus get the required rotation to send them at a high speed point first through the air. For this purpose they used to have rows of studs projecting and fitting into the grooves, or a coating of lead, which served the same purpose; but the projectile now usually has a flanged copper disc fitted on to the base, and the pressure of the gas when the charge is exploded forces out the flanges into the grooves. Among recent improvements may be mentioned the use of a "powder chamber" of greater diameter than the rest of the bore, and the adoption of an increased twist in the rifling instead of a uniform one. Guns for firing charges of dynamite or other powerful explosive have recently been experimented with. See also Gun-carriage, Artillery, Mortar, Howitzer, Machine Gun, Shell, etc.

**CANNON**, Joseph G., an American politician and congressman, born at Guilford, N. C., in 1836. He removed to Illinois and from 1873 to 1906 has been successively elected to the congresses between those years. He was elected speaker of the house of representatives in 1903.

**CANOE** (ka-nō'), a light boat narrow in the beam, and adapted to be propelled by paddles, often in conjunction with sails. The name was originally given to the boats of uncivilized races, but its application has been consider-



ably extended, and canoes of home make may be seen on the waters of the most civilized countries. They are of the most diverse materials and construction. Often they are hollowed out of a single log. The Indian canoes are of bark on a wooden frame. The Eskimo kaiaks consist of a light wooden frame, covered with seal-skins sewed together with sinews, and having only one opening to admit the boatman to his seat. In the islands of the Pacific the natives have double canoes, united by a strong platform, serving in this way as one vessel.

**CAN'ON**, a term given collectively to the books of the Holy Scriptures universally received as genuine by Christian churches. See Bible, Apocrypha.

**CAN'ON**, a church dignitary who possesses a prebend, or revenue allotted for the performance of divine service in a cathedral or collegiate church.

**CANON** (kan-yon'), the Spanish word for tube, funnel, cannon; applied by the Spanish Americans, and hence in N. America generally (often with the spelling Canyon), to long and narrow river gorges or deep ravines with precipitous and almost perpendicular sides occurring frequently in the Rocky Mountains, the Sierra Nevada, and great western plateaux of N. America.

**CANONICAL BOOKS**, the books of Scripture belonging to the canon. See Canon.

**CANONICAL HOURS**, certain stated times of the day appropriated by ecclesiastical law to the offices of prayer and devotion in the Roman Catholic Church, viz.: matins with lauds, prime, tierce, sext, nones, evensong or vespers, and compline.

**CANONICALS**, the dress or vestments of the clergy.

**CANONIZATION**, a ceremony in the Roman Church, by which deceased persons are declared saints. The pope institutes a formal investigation of the miraculous and other qualifications of the deceased person recommended for canonization; and an advocate of the devil, as he is called, is appointed to oppose the canonization and submit evidence. If the examination is satisfactory, the pope pronounces the beatification of the candidate, the actual canonization generally taking place some years afterward, when a day is dedicated to his honor, his name inserted in the calendar of the Saints, a solemn mass is celebrated by the pope, and his remains preserved as holy relics.

**CANON LAW**, a collection of ecclesiastical constitutions for the regulation of the Church of Rome, consisting for the most part of ordinances of general and provincial councils, decrees promulgated by the popes with the sanction of the cardinals, and decretal epistles and bulls of the popes. There is also a canon law for the regulation of the Church of England, which under certain restrictions is used in ecclesiastical courts and in the courts of the two universities.

**CAN'OPY**, a raised and ornamental covering above a throne, a bed, or the like; in architecture, a decorative structure serving as a hood or cover above an altar, pulpit, niche, etc.

**CANO'VA**, Antonio, an Italian sculptor, born in 1757 at Possagno, in Venetian territory. He was first an apprentice to a statuary in Bassano, from whom he went to the Academy of Venice, where he had a brilliant career. In 1779 he was sent by the senate of Venice to Rome with a salary of 300 ducats, and there produced his Theseus and the Slain Minotaur. In 1783 Canova undertook the execution of the tomb of Pope Clement XIV. in the Church of the Apostles, a work in the Bernini manner, and inferior to his second public monument the tomb of Pope Clement XIII. (1792) in St. Peter's. From 1783 his fame rapidly increased. He established a school for the benefit of young Venetians, and among other works produced his group of Venus and Adonis, the Psyche and Butterfly, a Repentant Magdalene, the well-known Hebe, the colossal Hercules hurling Lichas into the Sea, the Pugilists, and the group of Cupid and Psyche. In 1796 and 1797 Canova finished the model of the celebrated tomb of the Archduchess Christina of Austria, and in 1797 made the colossal model of a statue of the King of Naples executed in marble in 1803. He afterwards executed in Rome his Perseus with the Head of Medusa, which, when the Belvidere Apollo was carried to France, was thought not unworthy of its place and pedestal. In 1802 he was invited by Bonaparte to Paris to make the model of his colossal statue. Among the later works of the artist are a colossal Washington, the tombs of the Cardinal of York and of Pius VII.; a Venus Rising from the Bath; the colossal group of Theseus Killing the Minotaur; the tomb of Alfieri; the Graces Rising from the Bath; a Dancing Girl; a colossal Hector; a Paris, etc. After the second fall of Napoleon, in 1815, Canova was commissioned by the pope to demand the restoration of the works of art carried from Rome. He went from Paris to London, and returned to Rome in 1816, where he was made Marquis of Ischia, with a pension of 3000 scudi. He died at Venice, Oct. 13, 1822.

**CANROBERT** (kân-ro-bâr), François Certain, French marshal, born 1809. He commanded in the Crimean war under St. Arnaud, and after his death received the chief command, but could not work in harmony with the British and made way for Pélissier. In the Italian war (1859) he commanded the 3d division, and distinguished himself at Magenta. In the Franco-German war he belonged to the force that was shut up in Metz and had to capitulate. He was latterly a French senator. He died in 1895.

**CANTAL'**, a central department in France, area 2217 sq. miles; capital, Aurillac. This department, formerly part of Upper Auvergne, is named from its highest mountain, the Plomb du Cantal, 6094 feet in height. The principal crops are rye, buckwheat, potatoes, and chestnuts, hemp and flax. Cattle, sheep, pigs, horses, and mules are reared in large numbers. Large quantities of cheese ("Auvergne cheese") are made. Hot mineral springs are abundant. Pop. 241,742.

**CAN'TALIVER**, Cantilever, a wooden or iron block framed into the wall of a house and projecting from it to carry mouldings, eaves, balconies, etc. Also a large projecting framework forming part of an iron bridge directly carrying part of the roadway, and also supporting beams or girders bridging over a space between it and another similar structure.

**CAN'TALOUPE** (-löp), a small round variety of musk-melon, globular, ribbed, of pale green or yellow color, and of delicate flavor; first grown in Europe at the castle of Cantaloupe.

**CANTATA** (kan-tä'ta), a vocal composition, consisting of an intermixture of air, recitative, duet, trio, quartette, and chorus, often taking the form of a short oratorio or unacted opera.

**CANTEEN'**, in military language, a regimental establishment managed by a committee of officers, for the sale of liquors, tobacco, groceries, etc., to the soldiers at reasonable prices. The profits are employed for the benefit of the soldiers themselves.

**CAN'TERBURY**, a city, and parl., mun., and county borough of England, in Kent, 55 miles s.e. of London, giving name to an archiepiscopal see, the occupant of which is primate of all England. The foundation of the archiepiscopal see took place soon after the arrival of St. Augustine in 596. In the 8th, 9th, 10th, and 11th centuries the city was dreadfully ravaged by the Danes, but at the Conquest its buildings exceeded in extent those of London. The ecclesiastical importance of the place was consummated by the murder of Thomas a Becket in the cathedral, the priory and see benefiting by the offerings of devotees and pilgrims at his shrine. Henry VIII. dissolved the priory in 1539, and ordered the bones of Becket to be burned; and the troopers of Oliver Cromwell made a stable of the cathedral.—The cathedral, one of the finest ecclesiastical structures in England, 530 feet in length and 154 in breadth, has been built in different ages, the oldest part dating from about 1174. The great tower, 235 feet in height, is a splendid specimen of the Pointed style. Other ecclesiastical buildings are St. Augustine's monastery, now a Church missionary college, St. Margaret's Church, and the church dedicated to St. Martin, believed to be one of the oldest existing Christian churches. Canterbury has a royal grammar-school, founded by Henry VIII., numerous other schools, art gallery, etc. There are breweries and malting establishments; and the principal articles of trade are corn and hops. There are extensive barracks for cavalry and infantry. It returns one member to parliament. Pop. 24,868.

**CANTERBURY**, a district occupying most of the center of South Island, New Zealand, with a coast-line of 200 miles, and a greatest breadth of about 150 miles. The western part is traversed by mountains, from which a fertile plain of 2,500,000 acres slopes gradually down to the sea. The chief places in the province are Christchurch, the capital; and Lyttelton, the port town, 8 miles from Christchurch. Pop. 143,040.

**CANTILEVER**. See Cantaliver.



**CAN'TON**, a large and important city of Southern China, 80 miles from the sea, on the Pearl River, in the province of Quangtung (of which name Canton is a corruption). The city proper is enclosed by walls 25 feet high and 20 feet thick,



forming a circuit of six miles, with 12 gates; and it is divided into two parts by a wall running east and west; the larger portion north of this wall being called the old, that on the south of it the new city. The streets are long, straight, and in general paved, but very narrow, and gaudy with painted signs. The houses of the poorer classes are mere mud hovels; those of the shop-keeping class are commonly of two stories, the lower serving as the shop. The foreign mercantile houses, and the British, French, and American consulates, have as their special quarter an area in the suburbs in the southwest of the city, with water on two sides of it. In the European quarter are churches, schools, and other buildings in the European style. The river opposite the city for the space of four or five miles is crowded with boats, a large number of which—as many it is said as 40,000—are fixed residences, containing a population of 200,000. The industries of Canton are varied and important, embracing silk, cotton, porcelain, glass, paper, sugar, lacquered ware, ivory carving, metal goods, etc. It was the chief foreign emporium in China until 1850, when Shanghai began to surpass and other ports to compete with it but it exports and imports together often still amount to about \$40,000,000. Since the establishment of the colony of Hong-Kong a flotilla of river steamers ply daily between Canton, Hong-Kong, and Macao. In 1856 the foreign factories were pillaged and destroyed by the Chinese, and about a year after this Canton was taken by an English force, and occupied by an English and French garrison until 1861. Pop. estimated at over 1,600,000.

**CANTON**, a city and county-seat of Stark Co., Ohio, 60 miles south-southeast of Cleveland, on the Nimishillen Creek, and on the Cleveland, Canton & Southern, the Baltimore & Ohio, and the Pennsylvania railroads. Pop. 36,140.

**CANUCK**, in the U. States, a term used to designate a Canadian. In Canada it is applied to French Canadians. It is thought by some to have an Indian origin, by others to be a corruption of Connaught.

**CANUTE**, or **CNUT** (ka-nūt', knut), King of England and Denmark, suc-

ceeded his father Swegen or Sweyn on his death in England in 1014 A.D., and confirmed the Danish power in England. He began by devastating the eastern coast, and extended his ravages in the south, where, however, he failed to establish himself until after the assassination of Edmund Ironside, when he was accepted king of the whole of England (1017). Canute, who began his reign with barbarity and crime, afterward became a humane and wise monarch. He restored the English customs at a general assembly, and ensured to the Danes and English equal rights and equal protection of person and property, and even preferred English subjects to the most important posts. His power was confirmed by his marriage with Emma, Ethelred's widow. At Harold's death in 1018 he gained Denmark; in 1028 he conquered Norway; and in 1031 he made Malcolm of Scotland admit his superiority. Sweden also was vassal to him. He died in 1036 at Shaftesbury, leaving Norway to his eldest son, Sweyn; to the second, Harold, England; to the third, Hardicanute, Denmark.

**CAN'VAS**, a coarse and strong cloth, made of flax or hemp, and used for sails, tents, etc.

**CANVAS-BACK DUCK**, a bird peculiar to N. America, and considered the finest of the water-fowl for the table. They arrive in the U. States from the north about the middle of October, sometimes assembling in immense numbers. The plumage is black, white, chestnut-brown, and slate color; length about 20 inches.

**CAOUTCHOUC** (kō'chōk or kou'chōk), an elastic gummy substance chemically a hydrocarbon, contained in the milky juice of a number of tropical trees of various orders, growing in S. America. The name is also used as an equivalent of india-rubber, but strictly caoutchouc is only the chief ingredient of india-rubber. The crude india-rubber is most commonly obtained by making incisions in the trunks of the trees, whence the sap exudes in the form of a milky fluid which gradually thickens and solidifies. Caoutchouc is a non-conductor of electricity and a bad conductor of heat. It is not dissolved by water, hot or cold, but chloroform, oil of turpentine bi-sulphide of carbon, etc., dissolve it. India-rubber was at first only used to rub out pencil-marks, but before the end of last century it was



Caoutchouc tree.

used to render leather and other substances water-tight, and in 1823 Macintosh took out a patent for the water-proof materials prepared with caoutchouc which bear his name. Latterly its uses have become innumerable. Gutta

percha is a similar substance to caoutchouc, and is often popularly confounded with it. See India-rubber.

**CAP**, in ships, a strong piece of timber placed over the head or upper end of a mast, having in it a round hole to receive the top or top-gallant masts, which are thus kept steady and firm.

**CAP**, a covering for the head, usually of softer materials and less definite form than a hat. Cap of maintenance, a cap formerly worn by dukes and com-



Cap of maintenance, from great seal of Henry VII.

manders in token of excellency, now an ornament of state carried before the sovereigns of England at their coronation, and also before the mayors of some cities.

**CAPE BRETON**, an island of the Dominion of Canada, separated from Nova Scotia, to which province it belongs, by the narrow Gut or Strait of Canso; area 3120 sq. miles. Chief town, Sydney. Pop. of Cape Breton, 97,605.

**CAPE COD**, a noted peninsula of the United States on the s. side of Massachusetts Bay; 65 miles long and from 1 to 20 broad. It is mostly sandy and barren, but populous.

**CAPE COLONY**, a British colony occupying the southern extremity of Africa. Area (including southern Bechuanaland), 276,700 sq. miles; pop. about 1,738,000. The coast is not much indented; the principal bays are St. Helena, Saldanha, Table, False, Walker, Mossel, and Algoa. In the interior almost every variety of soil and surface is found, but a great part of the colony is arid and uninviting in appearance. Several ranges of mountains, running nearly parallel to the southern coast, divide the country into successive terraces, rising as they recede inland, between which lie belts of fertile land, or vast barren-looking plains, one of them the Great Karroo, being 300 miles long and 100 broad. The principal and furthest inland mountain terrace, averaging 6000 or 7000 ft. in height, commences in Namaqualand and runs to the northeast frontier. The culminating point is the Compass Berg, over 8000 ft. The Table Mountain at Cape Town rises almost perpendicularly about 3585 feet in height. The climate is very healthy and generally pleasant. Except along the coast, especially the southeast coast district, where there are extensive forests, timber is scarce, but with irrigation trees can be grown anywhere. The quadrupeds of the colony comprise the African elephant, still found in the forests of the southeast coast region; buffalo, wild-boar, zebra, quagga, leopard, hyena, numerous antelopes, baboon, armadillo, etc. The birds include vultures, eagles, the serpent-eater, pelicans, flamingoes, and, most important of all, the ostrich, now bred in farms for the sake of its feathers. The cobra and other reptiles are found.



The principal minerals are copper ore, coal, iron ore, manganese, and diamonds, amethysts, agates, etc. Coal and copper are worked, and the diamonds have brought a great amount of money into the colony since 1869, and have given rise to the town of Kimberley, the center of the diamond-fields. Wheat, maize, and other cereals can be grown almost everywhere, if there is sufficient moisture, in some years yielding a surplus for exportation. Sheep-rearing, especially that of pure merinos, is the most important industry, and wool the chief export. Ostrich feathers, hides, and skins are also exported. Both native and Angora goats are bred, and the export of mohair is important. Cattle breeding is also carried on to some extent. The colony is intersected by 2252 miles of railway, far-inland Kimberley, and still farther Johannesburg and Pretoria, being now thus connected with Cape Town and Port Elizabeth. The total value of diamonds produced is over \$400,000,000. The European inhabitants consist in part of English and Scottish settlers and their descendants, but, notwithstanding the recent influx of settlers from Britain, the majority are still probably of Dutch origin. The colored people are chiefly Hottentots, Kaffirs, Basutos, Griquas, Malays, and a mixed race. The laborers are chiefly Hottentots and Kaffirs. For the higher education there are four colleges, besides a university (at Cape Town) incorporated in 1873. Responsible government has been possessed by the colony since 1872. The executive is vested in the governor (who is appointed by the crown and is also commander-in-chief) and an executive council of office-holders appointed by the crown. The legislative is in the hands of a council of twenty-three members (the Upper House); and a representative house of assembly of ninety-five members (the Lower House), elected for five years. After Cape Town the chief towns are Kimberley, Port Elizabeth, Grahamstown, Beaconsfield, Paarl, and King William's Town. The Dutch first colonized the Cape in 1652, and till the end of the 18th century the colony was under the Dutch East India Company. It was held by the British from 1795-1801, and it came finally into British possession in 1806. The progress of the colony was long retarded by a series of Kaffir wars, the last of which was in 1851-53. Its involvements in the Boer war of 1899-1902 are still fresh in the memory of everyone.

**CAPE HORN, or THE HORN**, the southern extremity of an island of the same name, forming the most southerly point of South America. It is a dark, precipitous headland, 500 to 600 feet high, running far into the sea. Navigation round it is dangerous on account of frequent tempests. The cape was first doubled in 1616 by Schouten, a native of Hoorn, in Holland, whence its name.

**CAPE OF GOOD HOPE**, a celebrated promontory near the southern extremity of Africa, at the termination of a small peninsula extending south from Table Mountain which overlooks Cape Town. This peninsula forms the west

side of False Bay, and on its inner coast is Simon's Bay and Simon's Town, where there is a safe anchorage and a British naval station. Bartholomew



Diaz, who discovered the Cape in 1487, called it Cape of Storms; but John II. of Portugal changed this to its present designation. It was first doubled by Vasco de Gama in 1497.

**CA'PER**, the unopened flower-bud of a low trailing shrub, which grows from the crevices of rocks and walls, and among rubbish, in the countries bordering the Mediterranean. Picked and pickled in vinegar and salt they are much used as a condiment (caper-sauce being especially the accompaniment of boiled mutton). The plant was introduced into Britain as early as 1596, but has never been grown on a large scale. The flower-buds of the marsh-marigold and nasturtium are frequently pickled and eaten as a substitute for capers.

**CAPERNAUM** (ka-per'nā-um), a town in ancient Palestine, on the w. side of the Sea of Tiberias. Nothing of it now remains, but the site is identified with Tel Hum.

**CA'PET**, the name of the French race of kings which has given 118 sovereigns to Europe, viz. 36 kings of France, 22 kings of Portugal, 11 of Naples and Sicily, 5 of Spain, 3 of Hungary, 3 emperors of Constantinople, 3 kings of Navarre, 17 dukes of Burgundy, 12 dukes of Brittany, 2 dukes of Lorraine, and 4 dukes of Parma. The first of the Capets known in history was Robert the Strong, a Saxon, made Count of Anjou by Charles the Bold, and afterward duke of the Ile de France. His descendant, Hugh, son of Hugh the Great, was in 987 elected king of France in place of the Carolingians. On the failure of the direct line at the death of Charles IV. the French throne was kept in the family by the accession of the indirect line of Valois, and in 1589 by that of Bourbon. Capet being thus regarded as the family name of the kings of France, Louis XVI. was arraigned before the National Convention under the name of Louis Capet.

**CAPE TOWN**, capital of the Cape Colony, S. Africa, at the head of Table Bay, and at the base of Table Mountain, 30 miles from the Cape of Good Hope. The port has a break-water 3554 feet

long, two docks 16 acres in area, a large graving-dock, etc. Pop. 83,718.

**CAPE VERD**, the extreme w. point of Africa, between the Senegal and the Gambia, discovered by Fernandez, 1445.

**CAPE VERD ISLANDS**, a group of ten or fifteen volcanic islands and rocks in the Atlantic, 320 miles west of Cape Verd (see above), belonging to Portugal. They produce rice, maize, coffee, tobacco, the sugar-cane, physic-nuts, and various fruits. Coffee, hides, archil, physic-nuts, etc., are exported. Most of the inhabitants are negroes or mixed race. Porto Grande, on Sao Vicente, is a coaling station for steamers. Pop. about 147,000.

**CA'PIAS**, in English law, a writ of two sorts: one before judgment, called a *capias ad respondendum*, to take the defendant and make him answer to the plaintiff; the other, which issues after judgment, of divers kinds; as, a *capias ad satisfaciendum*, or writ of execution.

**CAP'ILLARIES**, in anatomy, the fine blood-vessels which form the links of connection between the extremities of the arteries and the beginnings of the veins.

**CAPILLAR'ITY**, the general name for certain phenomena exhibited by fluid surfaces when the vessels containing the liquid are very narrow, and also exhibited by that portion of the fluid surface which is in close proximity to the sides of a larger vessel, or to any inserted object. Thus if an open tube of small bore be inserted in water, it will be noted that the liquid rises within it above its former level to a height varying inversely as the diameter of the bore, and that the surface of this column is more or less concave in form (as in Fig. 1). The same phenomenon occurs in any fluid which will wet the tube; but in the case of a fluid like mercury, which does not wet the glass, the converse phenomenon appears, the liquid being depressed in the tube below its former level, and the portion within the tube exhibiting a convex surface (see Fig. 2). Similarly round the sides of the respective vessels, and round the outsides of



Fig. 1.



Fig. 2.

Capillarity.

the inserted tubes, we find in the first case an ascension, and in the second a depression of the liquid, with a corresponding concavity or convexity at its extreme edge. Two parallel plates immersed in the liquids give kindred results. As these phenomena occur equally in air and in vacuo they cannot be attributed to the action of the atmosphere, but depend upon molecular actions taking place between the particles of the liquid itself, and between the



liquid and the solid, these actions being confined to a very thin layer forming the superficial boundary of the fluid. Every liquid, in fact, behaves as if a thin film in a state of tension formed its external layer; and although the theory that such tension really exists in the superficial layer must be regarded as a scientific fiction, yet it adequately represents the effects of the real cause, whatever that may be. Scientific calculations with respect to capillary depressions and elevations proceed, therefore, on the working theory that the superficial film at the free surface is to be regarded as pressing the liquid inward, or pulling it outward according as the surface is convex or concave—the convex or concave film being known as the meniscus (crescent). The part which capillarity plays among natural phenomena is a very varied one. By it the fluids circulate in the porous tissues of animal bodies; the sap rises in plants, and moisture is absorbed from air and soil by the foliage and roots. For the same reason a sponge or lump of sugar, or a piece of blotting-paper soaks in moisture, the oil rises in the wick of a lamp, etc.

**CAP'ITAL**, in trade, the term applied, as the equivalent of "stock," to the money, or property convertible into money, used by a producer or trader for carrying on his business; in political economy, that portion of the produce of former labor which is reserved from consumption for employment in the further production of wealth—the apparatus of production. It is commonly divided under two main heads—circulating capital and fixed capital. Circulating capital comprises those forms of capital which require renewal after every use in production, being consumed (absorbed or transformed) in the single use, e.g. raw materials and wages. Fixed capital, on the other hand, comprises every form of capital which is capable of use in a series of similar productive acts, e.g. machinery, tools, etc. From the ordinary economic point of view capital is conveniently limited to material objects directly employed in the reproduction of material wealth, but from the higher social point of view many things less immediately concerned in productive work may be regarded as capital. Thus Adam Smith includes in the fixed capital of a country, "the acquired and useful abilities of all the inhabitants;" and the wealth sunk in prisons, educational institutions, etc., plays ultimately a scarcely less important part in production than that invested in directly productive machinery.

**CAPITAL**, an architectural term, usually restricted to the upper portion of a column, the part resting immediately on the shaft. In classic architecture each order has its distinctive capital, but in Egyptian, Indian, Saracenic, Norman, and Gothic they are much diversified. See Column.

**CAPITAL PUNISHMENT**, in criminal law, the punishment by death. Formerly it was the ordinary form of punishment for felonies of all kinds; but a more accurate knowledge of the nature and remedies of crime, a more discriminating sense of degrees in criminality,

and an increased regard for human life have latterly tended to restrict, if not to abolish, the employment of the penalty of death. In several European countries—Sweden, Denmark, North Germany, Bavaria, Austria—there is great unwillingness to enforce capital punishment, though the penalty remains upon the statute books. In Belgium there has been no execution since 1863. In Switzerland capital punishment was abolished in 1874, and though the right of restoring it was allowed to each canton in consequence of an increase of murders, only 7 out of a total of 22 have availed themselves of it. In Roumania it was abolished in 1864; in Holland in 1870; and it has also been discontinued in Portugal and Italy. In several of the U. States—Michigan, Wisconsin, Rhode Island, and Maine, imprisonment for life has been substituted for murder in the first degree; in the remainder capital punishment is retained, though the experiment of its abolition was made for a short time in New York and Iowa.

The manner of inflicting the punishment of death has varied greatly. Barbarous nations are generally inclined to severe and vindictive punishments; and even in civilized countries, in cases of a political nature, or of very great atrocity, the punishment has been sometimes inflicted with many horrible accompaniments, such as tearing the criminal to pieces, starving him to death, breaking his limbs upon the wheel, pressing him to death in a slow and lingering manner, burning him at the stake, crucifixion, etc. In modern times among civilized nations, public opinion is strongly disposed to discountenance the punishment of death by any but simple means; and even in governments where torture is still countenanced by the laws it is rarely or never resorted to. In the U. States, except New York, where it is done by electric shock, the method of execution is by hanging. In Germany and France the sword and the guillotine are the usual means; in Spain, strangulation by means of the garrote, a sort of iron collar tightened by a screw. Capital punishment cannot be inflicted, by the general humanity of the laws of modern nations, upon persons who are insane or who are pregnant, until the latter are delivered and the former become sane. In military law, sentence of death may be passed for various offenses, such as sedition, violence and gross neglect of duty, desertion, assault upon superior officers, disobedience to lawful commands, etc.

**CAPITALS**, the large letters used in writing and printing, most commonly as the initial letters of certain words. As among the ancient Greeks and Romans, so also in the early part of the middle ages, all books were written without any distinction in the kind of letters, large letters (capitals) being the only ones used; but gradually the practice became common of beginning a book, subsequently, also, the chief divisions and sections of a book, with a large capital letter, usually illuminated and otherwise richly ornamented.

**CAP'ITOL**, now Campidoglio, the citadel of ancient Rome, standing on the

Capitoline Hill, the smallest of the seven hills of Rome. It is used as a hotel de ville, museum, etc., contains some fine statues and paintings, and commands a superb view of the Campagna.—The name of capitol is also given to the edifice in Washington where Congress assembles. The various states also call their state-houses capitols.

**CAPITULA'TION**, in military language, the act of surrendering to an enemy upon stipulated terms, in opposition to surrender at discretion.

**CAPO D'ISTRIA**, John Antony, Count, Greek statesman, born at Corfu in 1776. In 1809 he entered the service of Russia and obtained an appointment in the department of foreign affairs. As imperial Russian plenipotentiary he subscribed the Treaty of Paris, Nov. 20 1815. In 1828 he became president of the Greek Republic, in which office he was very unpopular, and in 1831 he was assassinated.

**CAP'RICORNUS**, Capricorn, a constellation of the southern hemisphere, and one of the twelve signs of the zodiac, the one to which belongs the winter solstice, represented by the figure of a goat or a figure having the fore-part like a goat and the hind-part like a fish.

**CAPRIVI**, Georg Leo, Count von, a German statesman, successor to Bismarck in the chancellorship of the German empire. He was born at Charlottenburg, in 1831, died in Brandenburg, 1899. Caprivi distinguished himself in the Franco-Prussian war, and after serving in high commands in the army was made chief of the admiralty in 1883. After Bismarck's decline in health, Caprivi took the reins of government, but his administration was not satisfactory. He retired in 1894.

**CAP'SICUM**, a genus of annual, subshrubby plants, with a wheel-shaped corolla, projecting and converging stamens, and a many-seeded berry. They are chiefly natives of the East and



Capsicum.

West Indies, China, Brazil, and Egypt, but have spread to various other tropical or sub-tropical countries, being cultivated for their fruit, which in some reaches the size of an orange, is fleshy and variously colored, and contains a pungent principle which is present also and more largely in the seed. The fruit or pod is used for pickles, sauces, etc., and also medicinally. Several of them



yield Cayenne pepper, and are originally a native of S. America.

**CAP'STAN**, a strong upright column of timber, movable round a strong iron spindle, and having its upper extremity pierced to receive bars or levers, for winding a rope round it to raise weights, such as the anchors of a vessel, or to perform other work that requires great power. It is distinguished from a windlass by the axis, and consequently the barrel, being vertical.

**CAPTAIN**, one who is at the head or has authority over others, especially: (1) The military officer who commands a company, whether of infantry, cavalry, or artillery. (2) An officer in the navy commanding a ship of war. Captains of ships were formerly designated post-captains.—Captain of the fleet (in Britain), a flag-officer temporarily appointed by the admiralty, who acts as adjutant-general of the force, sees to the carrying out of the orders of the commander-in-chief, and to proper discipline being maintained in the fleet. (3) The master of a merchant vessel.

**CAPTION**, in law, a certificate stating the time and place of executing a commission in chancery, or of taking a deposition, or of the finding of an indictment, and the court or authority before which such act was performed, and such other particulars as are necessary to render it legal and valid.

**CAPUCHIN MONKEY** (kap-u-shēn'), a name given to various species of S. American monkeys. The hair of their heads is so arranged that it has the appearance of a capuchin's cowl, hence the name.

**CAPUCHINS** (kap-u-shēnz'), monks of the order of St. Francis, so called from the capuchon or capuce, a stuff cap or cowl, the distinguishing badge of the order. They are clothed in brown or gray, go barefooted, and never shave their beard.

**CAPYBA'RA**, a species of rodent, sometimes known by the name of the water-hog, and of the family Cavidæ (guinea-pig). It attains the length of



Capybara.

about 3 feet, and has a very large and thick head, a thick body covered with long, coarse, brown hair, and short legs, with long feet, which, being in a manner webbed, fit it for an aquatic life. It has no tail. It is common in several parts of S. America, and particularly in Brazil. It feeds on vegetables and fish, which it catches somewhat in the manner of the otter.

**CARABO'BO**, a state of Venezuela, washed on the n. by the Caribbean Sea. Area about 2984 sq. miles; pop. 167,499.

P. E.—15

The capital is Valencia, the chief port Puerto Cabello.

**CARACAL'LA**, Marcus Aurelius Antoninus, eldest son of the Emperor Severus, was born at Lyons A.D. 188, died 217. On the death of his father he succeeded to the throne with his brother Antoninus Geta, whom he speedily murdered. To effect his own security upward of 20,000 other victims were butchered. He was himself assassinated by Macrinus, the pretorian prefect, who succeeded him.

**CARAC'AS**, a city of S. America, capital of Venezuela, situated in a fine valley about 3000 feet above the Caribbean Sea, connected by railway with the port La Guayra, about 10 miles distant. In 1812 it was in great part destroyed by an earth-quake, and nearly 12,000 persons buried in the ruins. Pop. 72,429.

**CARAFE** (ka-raf'), the French name for an ordinary glass bottle or decanter for holding drinking water.

**CAR'AMEL**, the brown mass which cane-sugar becomes at 220° C., used in cookery as a coloring and flavoring ingredient, in giving a brown color to spirits, etc. The name is also given to a kind of candy.

**CAR'AT**, a weight of 3.17 troy grains, used by jewelers in weighing precious stones and pearls. The term is also used to express the proportionate fineness of gold. The whole mass of gold is divided into twenty-four equal parts, and it is called gold of so many carats as it contains twenty-fourth parts of pure metal. Thus if a mass contain twenty-two parts of pure gold out of every twenty-four it is gold of twenty-two carats.

**CARAVAGGIO**, Michel Angelo Amerighi, or Merighi da, a celebrated painter, born at Caravaggio 1569, died 1609. He attained distinction as a colorist of the Neapolitan school, being considered the head of the so-called Naturalists' school. He was coarse and violent in his character and habits, and was in continual trouble through his quarrelsome disposition. Among his chief pictures are the Card Player (at Dresden), the Burial of Christ, St. Sebastian, Supper at Emmaus, and a Holy Family.

**CAR'AVAN**, a Persian word used to denote large companies which travel together in Asia and Africa for the sake of security from robbers, having in view, principally, trade or pilgrimages. In Mohammedan countries caravans of pilgrims are annually formed to make the journey to Mecca. The most important are those which annually set out from Damascus and Cairo. Camels are used as a means of conveyance on account of their remarkable powers of endurance.

**CAR'AVEL**, the name of different kinds of vessels, particularly a small ship used by the Spaniards and Portuguese in the 15th and 16th centuries for long voyages. It was narrow at the poop, wide at the bow, and carried a double tower at its stern and a single one at its bows. It had four masts and a bowsprit, and the principal sails were lateen sails. It was in command of three such caravels that Columbus crossed the Atlantic and discovered America.

**CAR'AWAY**, an umbelliferous biennial plant, with a tapering fleshy root,

a striated furrowed stem, and white or pinkish flowers. It produces a well-known seed used in confectionery, and from which both a carminative oil is extracted and the liquor called kummel prepared.



Caravel of the fifteenth century.

**CARBAZOT'IC ACID**, a crystallizable acid and bitter substance obtained by the action of nitric acid on indigo and some other animal and vegetable substances. It is of great importance in dyeing. When silk which has been treated with a mordant of alum or cream of tartar, is immersed in a solution of this acid, it is dyed of a beautiful permanent yellow color. It is also called Picric Acid, and is used as an explosive.

**CAR'BIDE**, a compound of carbon with a metal, the usual effect of which is to render it hard and brittle. From calcium carbide acetylene gas is prepared.

**CARBOL'IC ACID**, an acid obtained from coal-tar. It is, when pure, a colorless crystalline substance, but it is usually found as an oily liquid, colorless, with a burning taste and the odor of creosote. Carbolic acid is now much employed as a therapeutic and disinfectant. It may be taken internally in cases in which creosote is indicated; but its principal use in medicine is as an external application to unhealthy sores, compound fractures, and to abscesses after they have been opened, over which it coagulates, forming a crust impermeable to air and to the organic germs floating in the atmosphere, which produce decomposition in the wound. The action of the acid is not only to exclude these germs but also to destroy such as may have been admitted, for which reason it is introduced into the interior of the wound. Called also Phenic Acid and Phenol.

**CARBON**, one of the elements, existing uncombined in three forms, charcoal, graphite or plumbago, and the diamond. The diamond is the purest form of carbon; in the different varieties of charcoal, in coal, anthracite, etc., it is more or less mixed with other substances. Pure charcoal is a black, brittle, light, and inodorous substance. It is usually the remains of some vegetable body from which all the volatile matter has been expelled by heat; but it may be obtained from most organic matters, animal as well as vegetable, by ignition in close vessels. Carbon being one of those elements which exist in various distinct forms is an example of what is called allotropy. The com-



pounds of this element are more numerous than those of all the other elements taken together. With hydrogen especially it forms a very large number of compounds, called hydrocarbons, which are possessed of the most diverse properties, chemical and physical. With oxygen, again, carbon forms only two compounds, but union between the two elements is easily effected. It is one of the regular and most characteristic constituents of both animals and plants. See Diamond, Charcoal, Graphite, Bone Black, Carbonic Acid, Coke, etc.

**CARBONATES**, compounds formed by the union of carbonic acid with a base, as the carbonate of lime, the carbonate of copper, etc. Carbonates are an important class of salts, many of them being extensively used in the arts and in medicine.

**CARBONDALE**, a city in Pennsylvania, about 110 miles n.n.w. of Philadelphia. It is the center of a rich coal-field. Pop. 17,000.

**CARBONIC ACID**, a gaseous compound of 12 parts by weight of carbon and 32 of oxygen, colorless, without smell, twenty-two times as heavy as hydrogen, turning blue litmus slightly red, and existing in the atmosphere to the extent of 1 volume in 2500. It is incapable of supporting combustion or animal life, acting as a narcotic poison when present in the air to the extent of only 4 or 5 per cent. It is disengaged from fermenting liquors and from decomposing vegetable and animal substances, and is largely evolved from fissures in the earth, constituting the choke-damp of mines. From its weight it has a tendency to subside into low places, vaults and wells, rendering some low-lying places, as the upas valley of Java, and many caves, uninhabitable. It has a pleasant, acidulous, pungent taste, and aerated beverages of all kinds—beer, champagne, and carbonated mineral water—owe their refreshing qualities to its presence, for though poisonous when taken into the lungs, it is agreeable when taken into the stomach. This acid is formed and given out during the respiration of animals, and in all ordinary combustions, from the oxidation of carbon in the fuel. It exists in large quantity in all limestones and marbles. It is evolved from the colored parts of the flowers of plants both by night and day, and from the green parts of plants during the night. During the day plants absorb it from the atmosphere through their leaves, and it forms an important part of their nourishment.

**CARBONIC OXIDE**, a substance obtained by transmitting carbonic acid over red-hot fragments of charcoal, contained in a tube of iron or porcelain, and also by several other processes. It is a colorless inodorous gas, has neither acid nor alkaline properties, is very poisonous, and burns with a pale lavender flame.

**CARBONIFEROUS SYSTEM**, in geology, the great group of strata which lie between the Old Red Sandstone below and the Permian or Dyas formation above, named from the quantities of coal, shale, and other carbonaceous matter contained in them. They in-

clude the coal measures, millstone grit, and mountain limestone, the first being uppermost and containing the chief coal-fields that are worked. Iron-ore, limestone, clay, and building-stone are also yielded abundantly by the carboniferous strata which are found in many parts of the world often covering large areas. As coal consists essentially of metamorphosed vegetable matter, fossil plants are very numerous in the carboniferous rocks, more than 1500 species of them having been named, a large proportion of which are ferns, tree lycopods, and large horse-tail-like plants. The animals include insects, scorpions, amphibians, numerous corals, crinoids, molluscs, cephalopods, sharks, and other fishes.

**CARBON POINTS**, in electric lighting, two pieces of very hard, compact carbon, between which the electric current is broken, so that the resistance which they offer to the passage of the current produces a light of extraordinary brilliancy.

**CARBUNCLE**, a beautiful gem of a deep red color with a mixture of scarlet, found in the East Indies. When held up to the sun it loses its deep tinge, and becomes exactly of the color of a burning coal. The carbuncle of the ancients is supposed to have been a garnet.

**CARBUNCLE**, in surgery, an inflammation of the true skin and tissue beneath it akin to that occurring in boils. It is more extensive than the latter, and instead of one has several cores. It is associated with a bad state of general health, from which condition its danger arises, for it may threaten life by exhaustion or blood poisoning. With regard to the local treatment, the principal thing to be done is to make a free incision into the tumor; as much of the contents as possible should then be pressed out, and a poultice applied. The patient's strength should be supported by nourishing and easily-digested food, and tonics and cordials should be administered.

**CARBURETTED HYDROGEN**, the name given to two compounds of carbon and hydrogen, one known as light carburetted hydrogen, and the other as olefiant gas. The former is the compound which occurs in coal-mines (fire-damp) and about the neighborhood of stagnant pools. Mixed with atmospheric air from 7 to 14 times that of the gas it explodes. The latter is obtained from distilling coal or fat substances in close vessels. It explodes when mixed with ten or twelve volumes of atmospheric air.

**CARD**, an instrument for combing, opening, and breaking wool, flax, etc., freeing it from the coarser parts and from extraneous matter. It is made by inserting bent teeth of wire in a thick piece of leather, and nailing this to a piece of oblong board to which a handle is attached. But wool and cotton are now generally carded in mills by teeth fixed on a wheel moved by machinery.

**CARD**, an oblong piece of thick paper or pasteboard prepared for various purposes. (1) A piece of card-board with one's name written or printed on it, used in visiting, and generally for indicating the name of the person presenting it.

(2) A piece of card-board on which are printed certain colored devices or figures forming one of a pack, and used in playing games. A modern pack of playing-cards numbers fifty-two, and consists of four suits, two red (hearts and diamonds), and two black (spades and clubs), each suit comprising thirteen cards—three picture-cards (court-cards), the king, queen, and knave; and ten other cards numbered from one, the ace, to ten, according to the pips or marks belonging to the respective suits printed on them.

**CARDAMOMS**, the aromatic capsules of different species of plants employed in medicine as well as an ingredient in sauces and curries.

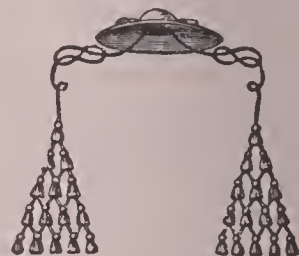
**CARDBOARD**, a kind of stiff paper or paste-board for cards, etc., usually made by sticking together several sheets of paper.

**CARDIAC MEDICINES**, medicines which act upon the heart.

**CARDIFF**, a municipal, county, and parl. borough and seaport, the county town of Glamorganshire, Wales, situated at the mouth of the Taff on the estuary of the Severn. Iron ship-building is carried on, and there are iron and other works on a large scale. Among the chief buildings are the county buildings, town-hall, infirmary, university college (for S. Wales and Monmouthshire), law courts, free library and museum, etc. The docks are extensive and well constructed. There is here a castle which dates from 1080. It is the property of the Marquis of Bute, and has been modernized and part of it converted into a residence. Pop. 164,420.

**CARDIGAN**, the county town of Cardiganshire, S. Wales, on the river Teifi, about 3 miles from its mouth in Cardigan Bay. The salmon fishery is extensively carried on. Pop. 3511.—The county of Cardigan has an area of 443,387 acres, of which two-thirds is under crops or pasture. Pop. 60,237.

**CARDINAL**, an ecclesiastical prince in the Roman Catholic Church, who has a voice in the conclave at the election of a pope, the popes being taken from the cardinals. The cardinals are appointed by the pope, and are divided into three



Cardinal's hat.

classes or orders, comprising six bishops, fifty priests, and fourteen deacons, making seventy at most. These constitute the Sacred College and compose the pope's council. Originally they were subordinate in rank to bishops; but they now have the precedence. The chief symbol of the dignity of cardinal is a low-crowned, broad-brimmed red hat, with two cords depending from it, one from either side, each having fifteen tassels at its extremity. Other insignia



are a red biretta, a purple cassock, a sapphire ring, etc.

**CARDINAL BIRD**, a North American bird of the finch family, with a fine red plumage, and a crest on the head. Its song resembles that of the nightingale, hence one of its common names, Virginian Nightingale. In size it is about equal to the starling. Called also Scarlet Grosbeak or Cardinal Grosbeak and Red-bird.

**CARDINAL-FLOWER**, the name commonly given, because of its large, very showy, and intensely red flowers; it is a native of North America.

**CARDINAL POINTS**, the n., s., e., and w. points of the horizon; the four intersections of the horizon with the meridian and the prime vertical circle.

**CARDINAL VIRTUES**, or **PRINCIPAL VIRTUES**, in morals, a name applied to justice, prudence, temperance, and fortitude.

**CARDING**, the process wool, cotton, flax, etc., undergo previous to spinning, to lay the fibers all in one direction, and remove all foreign substances. See Card.

**CARDITIS**, inflammation of the heart substance. Inflammation of the lining membrane is endocarditis, of the external membrane pericarditis. See Heart.

**CARDS, PLAYING**. See Card.

**CA'REY**, Henry, a composer, dramatist, and poet, born at London in 1696. He composed the words and music of many popular songs, including Sally in Our Alley, God Save the King, etc. He also wrote farces and other works. He is said to have committed suicide, 1743.

**CAREY**, Henry Charles, American economist, born in Philadelphia 1793, died 1879. In that year he published an essay on the Rate of Wages, which he afterward expanded into Principles of



William Carey.

Political Economy. His other important works are The Credit System, The Past, the Present, and the Future, The Principles of Social Science, etc. Originally a free-trader he became an advocate for protection; held that the growth of population was self-regulating; and was opposed to the theories of Ricardo and others on the law of diminished returns from the soil and on rent. He was also opposed to any arrangement on the subject of international copyright.

**CAREY**, William, D.D., an English oriental scholar and Christian mis-

sionary, born in 1761, died at Serampore 1834. In 1793 he sailed for the East Indies as a Baptist missionary, and in 1800, in conjunction with Marshman, Ward, and others, he founded the missionary college at Serampore. Here he had a printing-press, and issued various translations of the Scriptures. His first work was a Bengali Grammar. Under his direction the whole Bible was translated into six, and the New Testament into twenty-one Hindustani dialects. He was long professor of Sanskrit, Mahratta, and Bengali, in Calcutta.

**CARGO**, the goods or merchandise carried by a trading vessel from one place to another. When part of the cargo is on deck it is called the deck cargo, as distinguished from the inboard cargo.

**CAR'IAOUC**, the Virginian deer, found in all parts of North America up to 43° n. lat. It is smaller than the common stag, and its color varies with the season. In spring it is reddish-brown, in autumn slaty-blue, and in winter dull-brown. Written also Carjacou.

**CARIBBE'AN SEA**, that portion of the North Atlantic Ocean lying between the coasts of Central and South America, and the West India Islands. It communicates with the Gulf of Mexico by the Yucatan Channel.

**CAR'IBBEES**, or **LESSER ANTILLES**, usually divided into the Windward and Leeward Islands, a section of the West India Islands.

**CAR'IBOU**, the name of two American species of reindeer, sometimes regarded as specifically identical with the Old World reindeer. They have never been brought under the sway of man, but are a great object of chase for the sake of their flesh. The woodland caribou most nearly resembles the common reindeer. It is found over considerable tracts of Canada, as also in Newfoundland and Labrador, and is migratory in its habits. The Barren Ground caribou is much smaller, but has larger horns. It inhabits the Barren Grounds northwest of Hudson Bay, and also extends into Greenland. It executes considerable migrations, going north to the Arctic Ocean in summer, and returning in autumn.

**CAR'IBS**, the original inhabitants of the W. Indian Islands, and, when Europeans became acquainted with America, also found in certain portions of Central America and the north of South America. At present only a few remain on Trinidad, Dominica, and St. Vincent.

**CAR'ICA**. See Papaw.

**CAR'ICATURE**, a representation of the qualities and peculiarities of an object, but in such a way that beauties are concealed and peculiarities or defects exaggerated, so as to make the person or thing ridiculous, while a general likeness is retained. Though a degenerate, it is one of the oldest forms of art. Egyptian art has numerous specimens of caricature, and it has an important place in Greek and Roman art. It flourished in every European nation during the middle ages, and in the present day it is a chief feature in the comic and also in the leading daily journals.

**CA'RIES** (kā'ri-ēz), a disease of bone analogous to ulceration in soft tissues. The bone breaks down, or may be said to melt down into unhealthy matter, which works its way to the surface and bursts. Excision of the carious portion of the bone is often effected with good results, but the disease often results in death. Caries of the teeth is decay of the dentine or body of the tooth.

**CARINTH'IA**, a western duchy or province of Austria, on the borders of Italy; area, 4006 sq. miles. Pop. 367,344.

**CARLETON**, Will, an American poet, born in Michigan in 1845. His first volume of poems appeared in 1871. Farm Ballads appeared in 1873, Farm Legends in 1875, Young Folks Centennial Rhymes in 1876, Farm Festivals in 1881, City Ballads in 1885, City Festivals in 1892, and Rhymes of Our Planet in 1895. Carlton's best vein is domestic verses.

**CARLISLE** (kär-lil'), a parliamentary and municipal borough of England, county town of Cumberland. Sacked by the Danes, it was rebuilt by William Rufus. It was held by the Scots during their tenure of Cumberland, and the Church of St. Mary's was founded by David I., who died here. During the border wars Carlisle underwent many sieges. It surrendered to Charles Edward in 1745. It is a bishop's see. The cathedral, begun in the reign of William Rufus, was partly destroyed by Cromwell in 1648. Carlisle is the seat of various manufactures, of which cotton is the principal. Pop. 45,478.

**CARLISLE**, a town, in Pennsylvania, 114 miles w. Philadelphia. It is the seat of Dickinson Methodist College, founded in 1783. Pop. 11,526.

**CARLISLE**, John Griffin, an American statesman and lawyer, born in Kentucky in 1835, and speaker of the national house of representatives from 1883 to 1889. In 1890 he became United States Senator and was Secretary of the Treasury in the second cabinet of Cleveland.

**CAR'LISTS**, the name given to the followers of Don Carlos of Bourbon and his descendants. See Carlos de Bourbon.

**CARLOS'**, Don, Infant of Spain, son of Philip II., born 1545, died 1568. He was deformed in person, of a violent and vindictive disposition. He was presumably murdered, but of this there is no proof. The story of Don Carlos has furnished the subject of several tragedies, viz., by Otway (English), Schiller (German), and Alfieri (Italian).

**CARLOS DE BOURBON**, Don Maria Isidor, the second son of Charles IV. of Spain and brother of Ferdinand VII., born 1788, died 1855. He was heir presumptive to the throne until the birth of Maria Isabella in 1830. On the death of his brother he claimed the throne as legitimate king of Spain, and was recognized as such by a considerable party, who excited a civil war in his favor, and thenceforward were designated by the title of Carlists. After a course of hostilities he found himself obliged in 1839 to take shelter in France. In the meantime he and his descendants had been formally excluded from the suc-



cession by a vote of the Cortes in 1836. In 1845 he resigned his claims in favor of his eldest son, and in 1847 was permitted to take up his abode in Trieste, where he died. His eldest son, Don Carlos (1818-61), married Maria Carolina Ferdinanda, a sister of Ferdinand II., king of Naples. His nephew, Don Carlos, duke of Madrid, born 1848, is the present representative of the Carlists. He married the sister of the late Count of Chambord. In 1873 he instigated a rising in the north of Spain, and continued the struggle till after Alfonso XII. came to the throne, when he was defeated and withdrew. See Spain.

**CARLOTTA**, Empress, the daughter of King Leopold I. of Belgium and wife of the Archduke Maximilian, emperor of Mexico. She was born in 1840, accompanied her husband to Mexico in 1864, but the disasters which overtook her husband affected her mind, and she has lived in retirement in Belgium.

**CARLOVIN'GIANS**, the second dynasty of the French or Frankish kings, which supplanted the Merovingians, deriving the name from Charles Martel or his grandson Charlemagne (that is, Karl or Charles the Great). Charles Martel (715-741) and his son Pepin (741-768) were succeeded by Charlemagne and his brother Carloman (768-771). Charlemagne became sole king in 771, and was succeeded in the Empire of the West by his son Louis le Debonnaire 814. He divided his empire among his sons, and at his death (840) his son Charles the Bald became king of France. He died in 877, and was succeeded by a number of feeble princes. The dynasty came to an end with Louis V., who died in 987.

**CARLSBAD** (kärls'bát), a town of Bohemia, famous for its hot mineral springs, and much frequented by visitors from all parts of the world, being useful in diabetes, gout, biliary diseases, etc. Permanent pop. about 15,000.

**CARLSRUHE** (kärls'rö), the capital of the Grand-duchy of Baden, 3 miles from the Rhine, laid out in 1715, one of the most regularly-built towns in Europe. The castle of the grand-duke stands as a center, and from this point a number of streets radiate at regular distances, thus forming a kind of fan. There are many handsome edifices. The court library contains 100,000 volumes; there are also a large public library, several valuable museums and art collections, a botanic garden, polytechnic school, etc. The industries are active and varied. Pop. 97,164.

**CARLYLE**, Thomas, one of the greatest English writers of the 19th century, born 4th December, 1795, at Ecclefechan, Dumfriesshire; died at Chelsea, Feb. 5th, 1881. He was the eldest son of James Carlyle, a mason, afterward a farmer, and was intended for the church, with which object he was carefully educated at the parish school and afterward at the burgh school of Annan. In his fifteenth year (in 1810) he was sent to the University of Edinburgh, where he developed a strong taste for mathematics. Having renounced the idea of becoming a minister after finishing his curriculum (in 1814), he became a teacher for about four years,

first at Annan, afterwards at Kirkcaldy. In 1818 he removed to Edinburgh, where he supported himself by literary work, devoted much time to the study of German, and went through a varied and extensive course of reading in history, poetry, romance, and other fields. His first literary productions were short biographies and other articles for the Edinburgh Encyclopædia. His career as an author may be said to have begun with the issue in monthly portions of his *Life of Schiller* in 1823, this work being enlarged and published



Thomas Carlyle.

separately in 1825. In 1824 he published a translation of Legendre's *Geometry*, with an essay on proportion by himself prefixed. The same year appeared his translation of Goethe's *Wilhelm Meister's Apprenticeship*. He was next engaged in translating specimens of the German romance writers, published in 4 vols. in 1827. In 1826 he married Miss Jane Bailie Welsh, daughter of a doctor at Haddington, and a lineal descendant of John Knox. After his marriage he resided for a time in Edinburgh, and then withdrew to Craigenputtock, a farm in Dumfriesshire belonging to his wife, about 15 miles from the town of Dumfries. Here he wrote a number of critical and biographical articles for various periodicals; and here was written *Sartor Resartus*, the most original of his works. The publication of *Sartor* soon made Carlyle famous, and on his removal to London early in 1834 he became a prominent member of a brilliant literary circle embracing John Stuart Mill, Leigh Hunt, John Sterling, Julius Charles and Augustus William Hare, F. D. Maurice, etc. He fixed his abode at Cheyne Row, Chelsea, where his life henceforth was mainly spent. His next work of importance was on the French Revolution, published in 1837. About this time, and on one or two subsequent years, he delivered several series of lectures, the most important of these, *On Heroes and Hero-worship*, being published in 1840. *Chartism*, published in 1839, and *Past and Present*, in 1843, were small works bearing more or less on the affairs of the time. In 1845 appeared his *Oliver Cromwell's Letters and Speeches*, with *Elucidations*, a

work of great research, and brilliantly successful in vindicating the character of the great Protector. In 1850 came out his *Latter-day Pamphlets*. This work was very repulsive to many from the exaggeration of its language and its advocacy of harsh and coercive measures. He next wrote a life of his friend John Sterling, published in 1851, and regarded as a finished and artistic performance. The largest and most laborious work of his life, *The History of Friedrich II. of Prussia*, called *Frederick the Great*, next appeared, the first two volumes in 1858, the second two in 1862, and the last two in 1865, and after this time little came from his pen. In 1866, having been elected Lord Rector of Edinburgh University, he delivered an installation address to the students *On the Choice of Books*. He had appointed James Anthony Froude his literary executor, who, in conformity with his trust, published *Reminiscences of Thomas Carlyle*, 1881; *Thomas Carlyle: the First Forty Years of his Life*, 1882; *Letters of Jane Welsh Carlyle*, 1883; and *Thomas Carlyle: Life in London*, 1884. The character of Carlyle presented in these volumes gave an unexpected shock to the public, and a bitter controversy has raged regarding Froude's conduct in the matter.

**CARMAR'THEN**, or **CAERMAR'THEN**, a maritime county, S. Wales, the largest of the Welsh counties; area, 594,405 acres, of which about 440,000 are under tillage or permanent pasture. Pop. 135,325.—Carmarthen, the county town, is situated 9 miles from the sea, on the Towy, which is navigable to its outlet in Carmarthen Bay. Pop. 9935.

**CAR'MELITES**, mendicant friars of the order of Our Lady of Mount Carmel. From probably the 4th century holy



Carmelite.

men took up their abode as hermits on Mount Carmel, in Syria, but it was not till about the year 1150 that pilgrims established an association for the pur-



pose of leading a secluded life on this mountain, and so laid the foundation of the order. Being driven by the Saracens to Europe in 1247 they adopted all the forms of monastic life and a somewhat milder rule. In time they became divided into several branches, one of them distinguished by walking barefooted. They are still to be seen in Roman Catholic countries. The habit of the order is of a dark-brown color, and over it when out of doors they wear a white cloak, with a hood to cover the head.

**CAR'MINATIVES**, medicines obtained chiefly from the vegetable kingdom, and used as remedies for flatulence and spasmodic pains.

**CAR'MINE**, the fine red coloring matter or principle of cochineal, from which it is prepared in several ways. It is used to some extent in dyeing, in water-color painting, to color artificial flowers, confectionery, etc.

**CARNA'RIA**. Same as Carnivora.

**CARNAR'VON** or **CAERNARVON**, a maritime county of N. Wales, forming the n.w. extremity of the mainland; area, 369,477 acres. Although the most mountainous county in Wales there are many tracts of low and fertile land, but the arable area is small. Pop. 126,835. —**Carnarvon**, the county town, is a seaport and parliamentary borough on the s.e. side of the Menai Strait. The magnificent castle or palace of Edward I., and in which Edward II. was born, stands at the w. end of the town, and is still externally entire. Pop. 9760.

**CARNATION**, the popular name of varieties of the clove-pink. The carnations of the florists are much prized for the beautiful colors of their sweet-



Carnation.

scented double flowers. They are arranged into three classes according to color, viz.: bizarres, flakes, and picotees.

**CARNEGIE**, Andrew, an American philanthropist and steel manufacturer, born in Dumferline, Scotland, in 1837. He removed to the U. States as a boy and early became associated with the iron industry at Pittsburg. In 1868 he introduced the Bessemer process into this country and retired from active business life in 1901 with the organization of the United States Steel Corporation. He has given upward of \$40,000,000 in donations to education.

**CARNEGIE HERO FUND**, a fund of \$5,000,000 for the benefit of "the de-

pendents of those losing their lives in heroic effort to save their fellow men, or for the heroes themselves if injured only," created by Andrew Carnegie in 1904. Provision was also made for medals to be given in commemoration of heroic acts. The endowment known as "The Hero Fund" was placed in the hands of a commission composed of twenty persons, residents of Pittsburg, Pa. The first awards were made by the commission in May, 1905. Nine persons were awarded medals for brave acts, six of them receiving bronze medals, and three silver medals. To three widows who lost their husbands while the latter were performing acts of bravery money was given.

**CARNEGIE INSTITUTION**, a foundation of Andrew Carnegie for scientific research, with the co-operation of universities and other institutions. The institute was incorporated on Jan. 4, 1902, with a fund of \$10,000,000. It is administered by 27 trustees, one of them being the president of the U. States (ex officio). The purpose of the foundation is to encourage research in all departments of science and to pay the expenses of workers while devoting themselves to the work. The office of the institute is in Washington, D. C.

**CARNIO'LA**, a duchy or province of Austria, bounded by Carinthia, Styria, Croatia, and Italy; area, 3856 sq. miles. There are iron, lead, and quicksilver mines, and abundance of coal, marble, and valuable stone. Pop. 508,348. The capital is Laibach.

**CAR'NIVAL**, the feast or season of rejoicing before Lent, observed in Catholic countries with much revelry and merriment.

**CARNIV'ORA**, a term applicable to any creatures that feed on flesh or animal substances, but now applied specially to an order of mammals which prey upon other animals. The head is small, the jaws powerful, and the skin is well covered with hair. Two sets of teeth, deciduous or milk and permanent, are always developed in succession, and in both sets incisors, canines, and molars are distinguishable. The stomach is simple and the alimentary canal short, thus making the body as light and slender as possible for the purpose of hunting and springing on its prey. The muscular activity of the Carnivora is very great, their respiration and circulation very active, and their demand for food is consequently constant. Carnivora comprise the bears, badgers, raccoons, lions, tigers, cats, dogs, seals and walruses.

**CARNOT** (kár-nō), Lazare Nicolas Marguerite, a French statesman, general, and strategist, was born in 1753, and died in 1823. When the revolution broke out he was captain in the corps of engineers. In 1791 he was appointed deputy to the constituent assembly. In the following March he was sent to the Army of the North, where he took command, and successfully repulsed the enemy. On his return he was made member of the Committee of Public Safety, and directed and organized the French armies with great ability and success. In 1797 Carnot, having unsuccessfully opposed Barras, had to

escape to Germany, but returned, and was appointed minister of war by Napoleon (1800). In 1814 Napoleon gave him the chief command at Antwerp, and in 1815 the post of minister of the interior. After the emperor's second fall he retired from France. A grandson of his, Marie François Sadi, born in 1837, was elected president of the French republic in 1887, and assassinated in 1894.

**CAR'OL**, a song, especially one expressive of joy. It often signifies, specifically, a religious song or ballad in celebration of Christmas.

**CAROLI'NA**, North. (See North Carolina.)

**CAROLI'NA**, South. (See South Carolina.)

**CAROLINA-PINK**, a name given to a N. American plant bearing scarlet flowers, and having a root used as a vermifuge.

**CAROLINE**, British queen, was a daughter of the Duke of Brunswick-Wolfenbüttel, born May 17, 1768. In 1795 she was married to the Prince of Wales, afterward George IV. The marriage was not to his liking, and after the birth of the Princess Charlotte he separated from her. She died 7th Aug. 1821.

**CAROLINE ISLANDS**, or **NEW PHILIPPINES**, a large archipelago, North Pacific Ocean, between lat. 3° and 12° n. and lon. 132° and 163° 6' e., and between the Philippines and the Marshall Isles, first discovered by the Spaniards in 1543, if not by the Portuguese in 1525. Many of the islands are mere coral reefs little elevated above the ocean. The islands were long in the possession of Spain, but in 1899, after the conclusion of the war between that power and the U. States, they were sold to Germany.

**CARO'TID ARTERIES**, the two great arteries which convey the blood from the aorta to the head and the brain. The common carotids, one on either side of the neck, divide each into an external and an internal branch. The external carotid passes up to the level of the angle of the lower jaw, where it ends in branches to the neck, face, and outer parts of the head. The internal carotid passes deeply into the neck, and through an opening in the skull behind the ear enters the brain, supplying it and the eye with blood. Wounds of the carotid trunks cause almost immediate death.

**CARP**, a genus of soft-finned abdominal fish, distinguished by the small mouth, toothless jaws, and gills of three flat rays. They have but one dorsal fin,



Carp.

and the scales are generally of large size. They frequent fresh and quiet waters, feeding chiefly on vegetable matters, also on worms and molluscs. The common carp is olive-green above and yellowish below, and in many parts is bred in ponds for the use of the table. It sometimes weighs many pounds, is of



quick growth, and spawns thrice a year. It is said to live to the great age of 100 or even 200 years.

**CARPA'THIAN MOUNTAINS**, a range of mountains in southern Europe, chiefly in Austria, forming a great semi-circular belt of nearly 800 miles in length. The Carpathian range is rich in minerals, including gold, silver, quicksilver, copper, and iron. Salt occurs in beds, which have sometimes a thickness of 600 or 700 feet. On the plateaux corn and fruit are grown to the height of 1500 feet. Higher up the mountain steepes are covered with forests of pine. There is much remarkable scenery.

**CARPENTER-BEE**, the common name of the different species of insects numerous in Asia, Africa, and America, and one species inhabits the south of



Carpenter-bee, half the natural size.

1. A piece of wood bored by the bee, and grubs and food deposited in the cells. 2. Two of the cells drawn larger to show the partitions.

Europe. They are generally of a dark violet-blue, and of considerable size. They usually form their nests in pieces of half-rotten wood, cutting out various apartments for depositing their eggs.

**CARPENTRY** is the art of combining pieces of timber to support a weight or sustain pressure. The work of the carpenter is intended to give stability to a structure, that of the joiner is applied to finishing and decoration. An explanation of some of the terms employed in carpentry may be useful. The term frame is applied to any assemblage of pieces of timber firmly connected together. The points of meeting of the pieces of timber in a frame are called joints. Lengthening a beam is uniting pieces of timber into one length by joining their extremities. When neatness is not required this is done by fishing, that is, placing a piece of timber on each side of where the beams meet and securing it by bolts passed through the whole. When the width of the beam must be kept the same throughout scarfing is employed. This is cutting from each beam a part of the thickness of the timber, and on opposite sides, so that the pieces may be jointed together and bolted or hooped. When greater strength is required than can be produced by a single beam building and trussing beams are resorted to. Building beams is combining two or more beams in depth so as to have the effect of one. In trussing the beam is cut in two in the direction of its length, and supported with cross-beams, as in roofing. Mortise and tenon is a mode of jointing timber. An excavation called the mortise is made in one piece,

and a projecting tongue to fit it called the tenon in the other. The timber framework of floors is called naked flooring, and is single if there be but a single series of joists, double if there are cross-binding joists, and framed if there are girders or beams in addition to the joists. The roof is the framework by which the covering of a building is supported. It may consist of a series of sloping pieces of timber, with one end resting on one wall and the other end meeting in a point with a corresponding piece resting on the opposite wall: these are called rafters. There is usually a third piece which connects the lower extremities of the rafters and prevents them from spreading. This is called a tie, and the whole frame a couple. The principal instruments used in carpentry are saws, as the circular-, band-, and tenon-saws; planes, as the jack-plane, smoothing-plane, moulding-plane, etc.; chisels, gouges, brad-awls, gimlets, etc.

**CARPET**, a thick fabric, generally composed wholly or principally of wool, for covering the floors of apartments, staircases, and passages in the interior of a house. The Persian, Turkish, and Indian carpets are all woven by hand, and the design is formed by knotting into the warp tufts of woolen threads of the proper color one after the other. The Brussels carpet is a common and highly-esteemed variety. It is composed of linen thread and worsted, the latter forming the pattern. The linen basis does not appear on the surface, being concealed by the worsted, which is drawn through the reticulations and looped over wires that are afterward withdrawn, giving the surface a ribbed appearance. Wilton carpets are similar to Brussels in process of manufacture, but in them the loops are cut open by using wires with a knife-edge, and the surface thus gets a pile. Tapestry carpets also have a pile surface, the great specialty of which is that the threads are colored by printing in the proper manner for each design before being woven up. The Kidderminster or Scotch carpet consists of two distinct webs woven at the same time and knitted together by the woof. The pattern is the same on both sides of the cloth, but the colors are reversed. An improvement upon this is the three-ply carpeting, made originally at Kilmarnock. The original Axminster carpets were made on the principle of the Persian or Turkey carpets. Patent Axminster carpets have a fine pile, which is produced by using chenille as the weft, the projecting threads of which form the pile, which is dyed before being used. Carpets of felted wool, with designs printed on them, are also used, and are very cheap. Cheap jute carpets are also made.

**CARPET-BAGGER**, a needy political adventurer who goes about the country pandering to the prejudices of the ignorant with the view of getting into place or power, so called because regarded as having no more property than might fill a carpet-bag. Originally applied to needy adventurers of the northern states of America who tried in this way to gain the votes of the negroes of the southern states.

**CARPET-SWEEPER**, a device consisting of a closed box from which the ends of a brush protrude, used for sweeping carpets. The box is on rollers, is pushed by a long handle, and the dust is swept into the cavity of the box which can be opened and emptied at will.

**CARPUS**, in anatomy, the bones between the forearm and hand, the wrist in man, or corresponding part in other animals.

**CARRACCI** (kâr-râch'ê), Ludovico, Agostino, and Annibale, the three founders of the Bologna, or, as it has been called, the eclectic school of painting. —Ludovico was born in 1555 at Bologna. He set up a studio in Bologna, and established a school of painting characterized particularly by its attention to composition and its principle of eclecticism, or endeavor to imitate and unite the chief excellencies of different great masters, the drawing of Raphael, the coloring of Titian, etc. To assist him Ludovico had his two younger cousins, Agostino and Annibale, educated as artists; and after the completion of their studies all three by their able work soon made a high reputation for the academy of the Carracci at Bologna. He died in 1619. —Agostino was born in 1558 at Bologna; he died at Parma in 1601. He engraved more pieces than he painted, though some of his pictures were admired by contemporaries even more than those of his brother Annibale. —Annibale was born in 1560 at Bologna. In 1600 he was invited by Cardinal Farnese to Rome, where the influence of Raphael and Michael Angelo's work tempered the characteristics he had acquired from the Lombard and Venetian schools. His chief work is the series of frescoes for the Farnese Palace at Rome, which kept him eight years. He is generally considered the greatest of the Carracci. He died at Rome in 1609.

**CARRARA**, a city of northern Italy, 59 miles s.w. of Modena, a few miles from the coast. It is surrounded by hills which contain fine white statuary marble, in the preparation of which and commoner sorts most of the inhabitants are occupied. Pop. 16,000. —The Carrara marble is the variety generally employed by statuary. It was formerly supposed to be a primitive limestone, but is now considered an altered limestone of the Oolitic period. Although the Carrara quarries have been worked for 2000 years, having furnished the material for the Pantheon at Rome, the supply is still practically inexhaustible. They employ 6000 or 7000 men.

**CARRIAGE**, a general name for a vehicle, but more especially for one of the lighter and more ornamental kind.

**CARRIER**, is a person who undertakes to transport the goods of other persons from place to place for him. Persons who undertake this as a systematic business are called common carriers, and come under special legal regulations, such as that they shall be responsible for the goods intrusted to them so long as in their custody.

**CARRIER PIGEON** is a large bird with long wings, large tuberculated mass of naked skin at the base of the beak, and with a circle of naked skin round

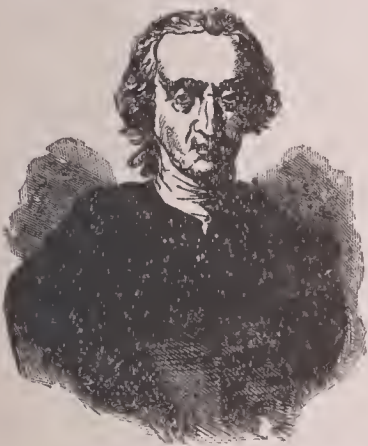


the eyes. The practice of sending letters by pigeons belongs originally to eastern countries. An actual post-system in which pigeons were the messengers was established at Bagdad by the Sultan Nureddin Mahmud, who died in 1174, and lasted till 1258. These birds can be utilized in this way only in virtue of what is called their "homing" faculty or instinct, which enables them to find their way back home from surprising distances. But if they are taken to the place from which the message is to be sent and kept there too long, say over a fortnight, they will forget their home and not return to it. By the use of microphotography a long message may be conveyed in this way, and such were received by the besieged residents in Paris during the Franco-Prussian war of 1870-71, the birds being conveyed out of the city in balloons. Seventy-two miles in two and a half hours, a hundred and eighty in four and a half, have been accomplished by carrier pigeons.

**CARRINGTON**, Henry Beebe, an American historian and soldier, born in Connecticut in 1824. In the civil war he was a brigadier-general of volunteers, and was subsequently an educator. He has published *Battles of the Revolution*, *Russia as a Nation* and other military historical works of note.

**CARRION-CROW**, in Britain the common crow, so called because it often feeds on carrion. In America the name is given to a small species of vulture called the Black Vulture.

**CARROLL**, Charles, of Carrollton, an American gentleman and patriot, born at Annapolis, Md., in 1737, died 1832. He was one of the signers of the Declara-



*Charles Carroll of Carrollton*

tion of Independence. He helped to draft the Maryland constitution and in 1789 was elected U. States senator. He was the last of the signers of the Declaration to die.

**CARROLL**, John, an American Roman Catholic bishop, the first in the U. States. He was born in Maryland in 1735, and was a cousin of Charles Carroll of Carrollton. He was the first archbishop of Baltimore and the founder of Georgetown College. He died in 1815.

**CARRONADE**, an iron gun introduced in 1779 by the director of the Carron Foundry, from which it took its name. They were of large caliber, but short and much lighter than common cannon.

They were of great service in close naval engagements, but they had a very short range, and have been superseded by more modern inventions.

**CARROT**, a biennial umbelliferous plant, a native of Britain and other parts of Europe. The leaves are tripinnate, of a handsome feathery appearance. The plant rises to the height of 2 feet, and produces white flowers. The root, in its wild state, is small, tapering, of a white color, and strong-flavored; but that of the cultivated variety is large, succulent, and of a red, yellow, or pale straw-color, and shows remarkably the improvement which may be effected by cultivation. It is cultivated for the table and as a food for cattle. Carrots contain a large proportion of saccharine matter, and attempts have been made to extract sugar from them.

**CARROUSEL** (kâr'ô-zel), a name given in the middle ages to a tilting match or other occasion when knightly exercises, such as riding at the ring, throwing the lance, were publicly engaged in. They were superseded by tournaments, but were again revived when the latter had fallen out of use, and were frequent at the court of Louis XIV. In the U. States the name is applied to a merry-go-round or movable platform filled with wooden horses on which children ride.

**CARRYING-TRADE**, that department of trade or commerce which consists in the carriage of commodities from one place or country to another; generally applied to the carrying of merchandise from one country to another by sea, especially when the vessels conveying the goods belong to a different country from either of the other two.

**CARSON**, Christopher ("Kit"), an American scout and trapper, born in Kentucky in 1809, died in 1868. He lived for a time in Missouri, crossed the continent to California in 1829, and served with distinction in the west during the civil war. Carson knew the American Indian perhaps better than any other scout and his adventures read like romances rather than sober facts. Several biographies of him have been published.

**CARSTAIRS**, or **CARSTARES**, William, a Scottish divine of political eminence, born in 1649 near Glasgow, died 1715. He studied at the University of Edinburgh, and afterward at Utrecht. He was introduced to the Prince of Orange, on whom he made a favorable impression. When William was settled on the throne Carstairs was constantly consulted by him on Scotch affairs. He was the chief agent between the Church of Scotland and the court, and was very instrumental in the establishment of Presbyterianism, to which William was averse. On the death of William he was no longer employed on public business, but Anne retained him as her chaplain royal, and made him principal of the University of Edinburgh. When the union of the two kingdoms was agitated he took a decided part in its favor. He was repeatedly moderator of the General Assembly of the church. His countrymen have mostly looked upon him as an enlightened patriot.

**CART**, a carriage with two wheels, with or without springs, fitted to be drawn by one horse, and used for carrying goods, or as a vehicle for conveying persons.

**CARTAGENA** (kâr-tâ-hâ'nî), or **CARTHAGENA** (kâr-thâ-jê'na), a fortified town and seaport of Spain, in the province of and 31 miles s.e. Murcia; with a harbor which is one of the largest and safest in the Mediterranean, sheltered by lofty hills. It is a naval and military station, with an arsenal, dockyards, etc. Lead smelting is largely carried on; and there are in the neighborhood rich mines of excellent iron. Cartagena was founded by the Carthaginians under Hasdrubal about 243 B.C., and was called New Carthage. It was taken by Scipio Africanus B.C. 210, and was long an important Roman town. It was ruined by the Goths, and revived in the time of Philip II. Pop. 99,871.

**CARTE-BLANCHE** (kârt-blânsh), a blank paper, duly signed, intrusted to a person to fill up as he pleases, and thus giving unlimited power to decide.

**CARTE-DE-VISITE** (kârt-dè-vi-zêt'), literally a visiting card, a name applied to a size of photographs somewhat larger than a visiting card, and usually inserted in a photographic album.

**CAR'TEL**, an agreement for the delivery of prisoners or deserters; also, a written challenge to a duel.—*Cartel-ship*, a ship commissioned in time of war to exchange prisoners.

**CARTER**, James Coolidge, an American lawyer, born in Massachusetts in 1850. He served on the New York constitutional commission in 1888 and in 1892 represented the U. States before the Bering Sea tribunal.

**CAR'THAGE**, the most famous city of Africa in antiquity, capital of a rich and powerful commercial republic, situated in the territory now belonging to Tunis. Carthage was the latest of the



Phœnician colonies in this district, and is supposed to have been founded by settlers from Tyre and from the neighboring Utica about the middle of the 9th century before Christ. The story of Dido and the foundation of Carthage is mere legend or invention. The history of Carthage falls naturally into three epochs. The first, from the foundation to 410 B.C., comprises the rise and culmination of Carthaginian power; the second from 410 to 265 B.C., is the period of the wars with the Sicilian Greeks; the third, from 265 to 146 B.C.,



the period of the wars with Rome, ending with the fall of Carthage.

The rise of Carthage may be attributed to the superiority of her site for commercial purposes, and the enterprise of her inhabitants, which soon acquired for her an ascendancy over the earlier Tyrian colonies in the district, Utica, Tunis, Hippo, Septis and Hadrumetum.

In extending her commerce Carthage was naturally led to the conquest of the various islands which from their position might serve as entrepôts for traffic with the northern shores of the Mediterranean. Sardinia was the first conquest of the Carthaginians, and its capital, Caralis, now Cagliari, was founded by them. Soon after they occupied Corsica, the Balearic, and many smaller islands in the Mediterranean. When the Persians under Xerxes invaded Greece the Carthaginians, who had already several settlements in the west of Sicily, cooperated by organizing a great expedition of 300,000 men against the Greek cities in Sicily. But the defeat of the Carthaginians at Himera by the Greeks under Gelon of Syracuse effectually checked their further progress (480 B.C.). The war with the Greeks in Sicily was not renewed till 410. Hannibal, the son of Gisco, invaded Sicily, reduced first Selinus and Himera, and then Agrigentum. Syracuse itself was only saved a little later by a pestilence which enfeebled the army of Himilco (396). The struggle between the Greeks and the Carthaginians continued at intervals with varying success, its most remarkable events being the military successes of the Corinthian Timoleon (345-340) at Syracuse, and the invasion of the Carthaginian territory in Africa by Agathocles B.C. 310. After the death of Agathocles the Greeks called in Pyrrhus, king of Epirus, to their aid, but notwithstanding numerous defeats (B.C. 277-5), the Carthaginians seemed, after the departure of Pyrrhus, to have the conquest of all Sicily at length within their power. The intervention of the Romans was now invoked, and with their invasion, B.C. 264, the third period of Carthaginian history begins. The first Punic war (L. Punicus, Phœnician), in which Rome and Carthage contended for the dominion of Sicily, was prolonged for twenty-three years, B.C. 264 to 241, and ended, through the exhaustion of the resources of Carthage, in her expulsion from the island. The loss of Sicily led to the acquisition of Spain for Carthage, which was almost solely the work of Hamilcar and Hasdrubal. The second Punic war, arising out of incidents connected with the Carthaginian conquests in Spain, and conducted on the side of the Carthaginians by the the genius of Hannibal, and distinguished by his great march on Rome and the victories of Lake Trasimene, Trebia, and Cannæ, lasted seventeen years, B.C. 218 to 201, and after just missing the overthrow of Rome, ended in the complete humiliation of Carthage. The policy of Rome in encouraging the African enemies of Carthage occasioned the third Punic war, in which Rome was the aggressor. This war, begun

B.C. 150, ended B.C. 146, in the total destruction of Carthage.

**CARTHAGE**, a city and county-seat of Jasper Co., Mo., 150 miles southeast of Kansas City, on Spring River, and on the Missouri Pacific, the Saint Louis and San Francisco, and other railroads. It has lead and zinc mines, stone and lime works, foundries, flour-mills, etc. Pop 11,220.

**CARTHU'SIANS**, a religious order instituted by St. Bruno, who about 1084, built several hermitages 4 leagues from Grenoble in s.e. France, and, with six companions, united the ascetic with



Carthusian monk.

the monastic life. They practiced the greatest abstinence, wore coarse garments, and ate only vegetables and the coarsest bread. From their original seat (La Chartreuse) they were called Carthusians. Their habit is a hair-cloth shirt, a white tunic, a black cloak, and a cowl.

**CARTIER**, Sir George Etienne, Canadian statesman, born at St. Antoine, Quebec, in 1814; died in England in 1873. He was admitted to the bar in 1835, took part in the rebellion of 1837, and had for a time to leave Canada. In 1848 he entered the Canadian Parliament, and in 1855 became provincial secretary. Next year he became attorney-general for Lower Canada, in which post he was active in behalf of legal reforms. In 1857 he was a member of the Macdonald ministry, and in 1858 he himself became premier, remaining in this position till 1862. He was active in bringing about the establishment of the Dominion of Canada in 1867, and held a post in the first Dominion cabinet. The following year he received a baronetcy.

**CARTIER** (kär-tyā), Jacques, a French navigator, born at St. Malo 1479, time of death not known. He commanded an expedition to N. America in 1534, entered the Straits of Belle Isle, and took possession of the mainland of Canada in name of Francis I. Next year he sailed up the St. Lawrence as

far as the present Montreal. He subsequently went to found a settlement in Canada, and built a fort near the site of Quebec. He was living in France in 1552.

**CAR'TILAGE**, or **GRISTLE**, a firm and very elastic substance occurring in vertebrate animals. When cut, the surface is uniform, and contains no visible cells, cavities, nor pores, but resembles the section of a piece of glue. It enters into the composition of parts whose functions require the combination of firmness with pliancy and flexibility, the preservation of a certain external form with the power of yielding to external force or pressure. The ends of bones entering into the formation of a joint are always coated with cartilage. Temporary cartilages are those from which bones are formed by ossification. The permanent cartilages are of various kinds. They are found in the external ear and aid in forming the nose, the larynx, etc.

**CARTOON'**, in painting, a drawing on stout paper or other material, intended to be used as a model for a large picture in fresco, a process in which it is necessary to complete the picture portion by portion and in which a fault cannot afterward be easily corrected. The cartoon is made exactly the size of the picture intended, and the design is transferred to the surface to be ornamented by tracing or other processes. Cartoons executed in color, like paintings, are used for designs in tapestries, mosaics, etc. The most famous are those painted by Raphael for the Vatican tapestries, seven of which are still preserved in the South Kensington Museum, London. In modern times the term is also applied to a pictorial sketch relating to some notable character or events of the day.

**CARTOUCHE** (kär'tōsh), (1) in architecture, a sculptured ornament in the form of a scroll unrolled, often appearing on the cornices of columns, used as a field for inscriptions, etc.—(2) In



Cartouche.

heraldry, a sort of oval shield, much used by the popes and secular princes in Italy, and others, both clergy and laity, for painting or engraving their arms on.—(3) The name given to that oval ring or border which includes, in the Egyptian hieroglyphics, the names of persons of high distinction. The annexed cut shows a cartouche of one of the Ptolemies, kings of Egypt, with the inscription "Ptolemy eternal beloved of Phtah."

**CAR'TRIDGE**, a case of paper, parchment, or flannel suited to the bore of fire-arms, and holding the exact charge, including, in the case of small arms, both powder and bullet (or shot). In loading with the old style of cartridge for muzzle-loading rifles, the paper over the powder was bitten or twisted off and the powder poured in, the bullet being then inserted and rammed home. The car-



tridges used for breech-loading rifles contain the powder in a case of solid brass, and have the percussion-cap by which they are ignited fixed in the base. Such cases can be refilled and used a number of times in succession. Cartridges for shot-guns are similar to those for rifles, but are usually of less solid construction, being commonly of strong paper with a base of metal. Those for large guns are usually made of flannel and contain only the powder. Blank-cartridge is a cartridge without ball or shot. Cartridges for blasting are filled with dynamite or other explosive.

**CARTWRIGHT**, Edmund, the inventor of the power-loom, was born in 1742 in Nottinghamshire, Eng. He was educated at Oxford, and took orders in the church. In 1785, he brought his first power-loom into action. Although much opposed both by manufacturers and workmen, it made its way, and in a developed and improved form is now in universal use. He died in 1823.

**CARTWRIGHT**, Peter, an American clergyman, born in Virginia in 1785, died 1872. He was noted for the revivals he preached in Illinois and for the large number of converts he made.

**CARVING**, as a branch of art, is the process of cutting a hard body by means of a sharp instrument into some particular shape, and is a term generally employed in speaking of figures cut out in ivory or wood, in contradistinction to sculpture, or figures produced in stone or metal. The art of carving is of the highest antiquity. Even among the most uncivilized tribes, rudely-carved representations in wood are common. In the early and middle ages wood-carving became general for the decoration of Christian churches and altars. One of the latest developments of the art of carving is the modern invention of carving by machinery. A machine patented in 1845 is capable of copying any carved design that can be produced, so far as that is possible, by revolving tools; the finish is afterward given by hand-labor.

**CARY**, Alice and Phœbe, two American poets, sisters. Alice was born in Ohio, in 1820, and died in 1871, Phœbe was born in Ohio in 1824, and died in 1871. Their first book of poems appeared in 1850 under the title *Poems of Alice and Phœbe Cary*. From 1850 to 1869 the sisters issued numerous volumes of verses which won them international fame. They died within three months of each other.

**CARY**, Alice Louise, an American operatic singer, born in Maine in 1842. Her rich contralto voice early attracted attention and after studying in Italy, made her debut in Copenhagen in 1868. In 1870 she appeared in New York and for many years was the favorite American singer. She married Charles M. Raymond in 1882.

**CARYATIDES** (-dēz), or **CAR'YATIDS**, in architecture, figures of women dressed in long robes, serving to support entablatures.

**CARYOPHYLLA'CEÆ**, an order of plants, of which the pink, may be considered as the type. The plants have opposite undivided leaves, without stipules, tumid articulations of the stems,

and seeds disposed upon a free central placenta, surrounded by several carpellary leaves. The great proportion of the species are inconspicuous weeds, like chick-weed, sandwort, etc., but



Caryatides.

many are found as favorite plants in our gardens, as the carnation, sweet-william, etc.

**CASCADE RANGE**, a range of mountains in North America, near the Pacific coast, to which they are parallel, extending from the Sierra Nevada in California northward to Alaska. It contains several active volcanoes. Highest peak, Mount St. Elias, 18,017 feet. The highest peaks in the U. States portion of it are in Washington territory, where Tacoma reaches 14,444 feet.

**CASE**, in grammar, a term indicating certain relationships in which nouns and pronouns may stand as regards other words, and which are often marked by special forms or inflections. A word that is the subject of a verb is generally said to be in the nominative case, one that is an object in the objective or accusative case. In English these two cases are alike except in pronouns, the only inflected noun-case in English being the possessive. English pronouns have three cases—nominative, possessive, and objective, as he, his, him. In Sanskrit there are eight cases. In French, Italian, Spanish and Portuguese there are no case-forms. In German there are four cases, nominative, genitive, dative, accusative.

**CASE**, in law, a cause or action, or a statement on which a decision is to be given.

**CASE-HARDENING** is a process by which iron is superficially converted into steel, in such articles as require the toughness of the former conjointly with the hardness of the latter substance. The articles intended for case-hardening are first manufactured in iron, and are then placed in an iron box, with charcoal in powder, and heated to redness. Immersion into water then converts the surface into a coating of steel.

**CASEIN** (kā'sē-in), that ingredient in milk which is neither coagulated spontaneously, like fibrin, nor by heat, like albumen, but by the action of acids alone, and constituting the chief part of the nitrogenized matter contained in it. Cheese made from skimmed milk and well pressed is fully half casein. Casein is one of the most important elements of animal food as found in milk and leguminous plants. It consists of carbon 53·7 per cent, hydrogen 7·15, nitrogen 15·65, oxygen 22·65, and sulphur 0·85.

**CASE/MATES** (from the Spanish casa, a house, and matare, to kill), in fortification, vaults which are proof against bombs, and which may serve as a place for keeping ordnance, ammunition, etc., and in case of necessity as habitations for the garrison.

**CASEMENT**, a frame inclosing part of the glazing of a window and opening on hinges.

**CASER'TA**, or **CASERTA NUOVA**, the capital of the province of Caserta, south Italy, in a plain, 7 miles e.s.e. of Capua and 18 from Naples. The principal edifice is the royal palace, a large and richly-decorated structure, commenced in 1752 by Charles III. of Spain. Pop. 20,000.—The province has an area of 2307 sq. miles and a pop. of 805,305.

**CASE-SHOT**, in artillery, is formed by putting a quantity of small iron balls into a cylindrical tin box called a canister, that just fits the bore of the gun. This kind of shot is very injurious to an enemy within a short distance. The shrapnel-shell is a modern variety of case-shot.

**CASH CREDIT**. A cash credit is an account which the trader may overdraw to a certain amount as he may require, paying cash in and taking it out according to his needs within that limit. Heritable property, two sureties, or some other form of security is usually demanded by the bank.

**CASH'MERE**, an extensive principality in the n.w. of Hindustan, subject to a ruler (the Maharajah) belonging to the Sikh race. The principality embraces not only Cashmere proper, but also Jamoo or Jummo, Baltistan or Little Tibet, Ladakh, Gilghit, etc. The area is estimated at 80,000 sq. miles. It extends from about 32° to 37° n. lat., and from about 73° to 80° e. lon., and is largely a region of mountains, containing magnificent glaciers. The elevated situation of the valley, and the mountains of snow which surround it, render the climate rather cold; but the region is well watered by streams and very fertile. Among its minerals are iron and plumbago. Sulphur springs are common. Earthquakes frequently occur, and in 1885 one caused the loss of thousands of lives. Bears, leopards, wolves, the ibex, and chamois are among the animals. The flora has a strong affinity to that of Europe; the deodar cedar forms extensive and valuable forests. The chief crops are wheat, barley, rice, and Indian corn, and two harvests are reaped in the year. The chief manufacture is that of the celebrated Cashmere shawls. The genuine Cashmere shawls owe their superiority to the material of which they are made, which is, properly



## CASHMERE GOAT

speaking, not wool, but a fine kind of down with which the animals of this region are clad during the winter season, and which in length and fineness far surpasses the merino wool. This down is obtained in great quantities from the Cashmere goat, the yak of Tibet, and the wild sheep. The average time taken to manufacture a good Cashmere shawl is from sixteen to twenty weeks. The inhabitants of Cashmere are a fine race physically, tall, strong, and well-built, with regular features. There are thirteen separate dialects in use. The Maharajah is independent, but his relations with other states are subject to the authority of the government of India. The capital of the whole principality is Srinagar (or Cashmere), which is the Maharajah's usual residence and the largest town. Population 2,906,173, about 1,800,000 being Mohammedans and 700,000 Hindus.

**CASHMERE GOAT**, a variety of the common goat remarkable for its fine downy fleece, said to be found in perfection only in Tibet in the neighborhood of Lhasa, but also found in other parts of this region, including Ladakh, now a province of Cashmere. The colder the region where the goat pastures, the heavier is its fleece. A full-grown goat yields not more than 8 ounces, the fine curled wool being close to the skin. A large shawl of the finest quality requires 5 lbs. of the wool; one of the inferior quality from 3 to 4 lbs.

**CASHMERE SHAWL.** See Cashmere and Cashmere Goat.

**CASINO**, a word used, in the U. States to designate some place of amusement or recreation. It is derived from the Italian in which tongue it means a little house, and formerly Italian noblemen built casinos adjacent to their castles.

**CASPIAN SEA**, a large lake or inland sea between Europe and Asia, 730 miles in length from n. to s., and from 130 to 270 in breadth; area, 170,000 sq. miles, the largest isolated sheet of water on the globe. Its surface is 85 feet below that of the Sea of Azof; greatest depth about 3250 feet. Russian territory surrounds it on three sides, Persia on the fourth.

**CASS**, George Washington, an American engineer and railroad man, born in Ohio in 1810, died in 1888. He assisted in the development of the Adams Express Company, of the Pittsburg, Fort Wayne & Chicago, and of the Northern Pacific railroads.

**CASS**, Lewis, an American politician, born in Exeter, New Hampshire, in 1782. In 1813, having entered the army, he rose to the rank of general; in 1814-30 was governor of Michigan, was minister of war in 1831, was a candidate for the presidency several times, was long a senator, and in 1857-60 was secretary of state. He wrote the History Traditions, Languages, etc., of Indians in the U. States. He died in June, 1866.

**CASSAN'DER**, a king of Macedonia, born about 354 B.C. He displaced his brother Polysperchon in the regency, removed in succession the mother, the wife, and the son of Alexander the Great to make way for himself to the throne. He married Thessalonica, Alexander's half-sister, and founded the city of that

name in her honor. In company with Seleucus, Ptolmy, and Lysimachus he defeated and slew Antigonus, king of Asia, whose dominions were divided among the conquerors. He died in 297 B.C.

**CASSAN'DRA**, in Greek legend, a daughter of Priam and Hecuba. She is fabled to have been endowed by Apollo with the gift of prophecy, coupled with this disadvantage, that her prophecies should never be believed. She frequently foretold the fall of Troy, and warned her countrymen in vain against the stratagem of the horse.

**CASSA'TION**, a term used in the courts on the continent of Europe, signifying the annulling of any act or decision, if the forms prescribed by law have been neglected, or if anything is contained in it contrary to law.—Court of Cassation, one of the most important institutions of modern France, established by the first national assembly in 1790. In 1814 the number of its members was fixed at forty-nine, at which it still remains. The members are appointed for life. The sphere of this court is to decide on the competency of the other courts, and on the petitions to have their decisions reviewed or annulled. Its decisions are not only recorded in the journals of the courts the decisions of which are reversed, but published likewise in an official bulletin. It has enjoyed from its commencement the respect and confidence of France.



Lewis Cass.

**CASSA'VA**, a South American shrub, about 8 feet in height, with broad, shining, and somewhat hand-shaped leaves, and beautiful white and rose-colored flowers. A nutritious starch is obtained from the white soft root of the plant, and is called by the same name. It is prepared in the West Indies, tropical America, and in Africa in the following manner:—The roots are washed, stripped of their rind, and grated down to a pulp, which is put into coarse, strong canvas bags, and submitted to powerful pressure to express the juice, which is highly poisonous in its natural state. The flour that remains after pressing is formed into cakes, and baked on a hot iron plate. In this state it forms a valuable article of food, upon which many of the inhabitants of

## CASSINI

southern America live almost entirely. From cassava the tapioca of commerce is prepared. Another species, the sweet cassava, has roots the juice of which is not poisonous, and which are an agreeable and nutritive food.



Cassava plant.

**CAS'SEL**, or **KASSEL**, formerly the residence of the Elector of Hesse-Cassel, is now the chief town in the province of Hessen-Nassau, Prussia, on the Fulda, 91 miles n.n.e. of Frankfort-on-the-Main. There are many fine walks and public gardens in the vicinity; among the latter are the gardens of Wilhelmshöhe, in which is situated the ex-electors' summer palace, the residence of the late Emperor Napoleon III., after his being taken prisoner at Sedan, from Sept. 5, 1870, to March 19, 1871. Pop. 106,001.

**CASSIMIR-PERIER**, Jean Paul Pierre, a French statesman, born in 1857 at Paris, and president of the French Republic in 1894 and 1895. He won distinction in the Franco-Prussian war, was elected to the chamber of deputies in 1874, vice-president of the chamber in 1890 and president of the chamber in 1893. In December of that year Cassimir-Perier was called to be prime minister under Carnot and in 1894, on the assassination of Carnot he was elected to the presidency of the republic. Although believed to be a royalist, he has always acted as a moderate republican.

**CASSIN**, John, an American ornithologist, born in 1813 at Chester, Pa., died 1869. He wrote several authoritative works on North American birds.

**CASSINI**, a name famous in astronomy and physics for three generations:—(1) Giovanni Domenico, born in 1625 near Nice. He discovered four new satellites of Saturn and the zodiacal light, proved that the axis of the moon is not perpendicular to the plane of the ecliptic, and showed the causes of her libration. He died in 1712.—(2) Jacques, his son, born at Paris in 1677. After several essays on subjects in natural philosophy, etc., he completed his great work on Saturn's satellites and ring. He died in 1756.—(3) Cassini de Thury, César François, son of the preceding, born in 1714, member of the Academy from his twenty-second year, undertook a geometrical survey of the whole of France, which was completed by his son. He died in 1784.—(4) Cassini, Jean Dominique, Count de Thury, son of the preceding, born at Paris 1748. In 1787 he completed the topographical work



which was begun by his father, and which in its complete state consists of 180 sheets. He died in 1845.

**CASSI'NO**, a game at cards somewhat resembling whist.

**CAS'SIUS**, full name Caius Cassius Longinus, a distinguished Roman, one of the assassins of Julius Cæsar. In the civil war that broke out between Pompey and Cæsar he espoused the cause of the former, and, as commander of his naval forces, rendered him important services. After the battle of Pharsalia he was apparently reconciled with Cæsar, but later was among the more active of the conspirators who assassinated him B.C. 44. He then, together, with Brutus, raised an army, but they were met by Octavianus and Antony at Philippi. The wing which Cassius commanded being defeated, he imagined that all was lost, and killed himself, B.C. 42.

**CAS'SOCK**, a tight-fitting coat worn under the gown or surplice by the clergy. The cassock is generally black; but in the Church of Rome only the ordinary priests wear black cassocks, those of bishops being purple, of cardinals scarlet, and that of the pope white.

**CAS'SOWARY**, a family of birds akin to the ostrich, emeu, etc., among living, the moa and others among extinct, birds. The shortness of their wings

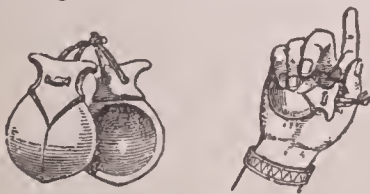


Helmeted cassowary.

totally unfits them for flying, and, like others of their order, the pectoral or wing muscles are comparatively slight and weak, while those of their posterior limbs are very robust and powerful.

**CAST**, in the fine arts, is an impression taken by means of wax or plaster of Paris from a statue, bust, bas-relief, or any other model, animate or inanimate. When plaster casts are to be exposed to the weather their durability is greatly increased by saturating them with linseed-oil, with which wax or rosin may be combined.

**CAS'TANETS**, an instrument composed of two small concave shells of ivory or hardwood, shaped like spoons, placed together, fastened to the thumb,



Castanets.

and beat with the middle finger. This instrument is used by the Spaniards and Moors as an accompaniment to their dances and guitars.

**CASTE**, a term applied to a distinct class or section of a people marked off from others by certain restrictions, and whose burdens or privileges are hereditary. The word is derived from the Portuguese *casta*, a breed or race, and was originally applied to the classes in India whose occupations, customs, privileges, and duties are hereditary. It is probable that wherever caste exists it was originally grounded on a difference of descent and mode of living, and that the separate castes were originally separate races. It now prevails principally in India, but it is known to exist or have existed in many other regions. "The effect of the caste system is," as the Cyclopaedia of India says, "that no man may lawfully eat with any individual of any other caste, or partake of food cooked by him, or marry into another caste family; but he may be his friend, his master, his servant, his partner." Those that are outside of any caste are known as pariahs.

**CASTELAR'**, Emilio, a Spanish politician and author, born in 1833. In 1856 he was made professor of history in the University of Madrid, but becoming involved in the republican disturbances of 1866, he had to take refuge in Switzerland. Having gone back to Spain in 1868 he was returned to the Cortes in the following year. In 1873 he was elected president of the republican Cortes, but resigned in Jan. 1874, in consequence of the vote of confidence being defeated. After the pronunciamiento in favor of Alphonso XII., Dec. 13, 1874, Castelar retired from Spain, but in a year or two returned, and again sat in the Cortes. He died in 1899. He published many novels, poems, and popular works.

**CASTELLON-DE-LA-PLANA** (kás-tel-yon'), a town, Spain, capital of the province of Castellon, 40 miles n.e. of Valencia, in a large and fertile plain, with manufactures of sail-cloth, woolen and hempen fabrics, ropes, paper, soap, etc., and some trade in hemp, grain, and fruit. Pop. of town, 31,272; of province, 304,477; area of latter, 2445 sq. miles.

**CASTILE** (kas-tél'), an ancient kingdom of Spain, the nucleus of the Spanish monarchy, extends over a large part of the peninsula from the Bay of Biscay southward. It is divided into New Castile and Old Castile. The former occupies nearly the center of the peninsula; area, 28,010 sq. miles. It is traversed from e. to w. by three lofty mountain chains, nearly parallel to each other—the Sierra Guadarrama, the mountains of Toledo and Sierra Molina, and the Sierra Morena. Between these chains, which form the great watersheds of the province, lie two extensive plains or plateaux, almost without wood, and arid and barren in appearance. Dryness, indeed, is the curse of the whole country, and there is a great deficiency of method alike in agriculture and industries. The inhabitants are of a grave, manly character, with much of the old Spanish pride and probity, but devoid of enterprise, and content to live on from day to day as their fathers did before them. This ancient province now forms the five provinces of Madrid, Ciudad-Real, Cuenca, Guadalajara, and

Toledo. Pop. 1,853,314.—Old Castile stretches from the Bay of Biscay to New Castile; area, 25,405 sq. miles. It is traversed by three mountain chains—the Sierra de Guadarrama, the Sierra de Deza, and the Cantabrian Mountains. It is less dry than New Castile, and grain, particularly wheat, is raised in great abundance. The pastures both of the mountains and the plains are excellent, and much merino wool is produced. Old Castile now forms the provinces of Burgos, Logroño, Santander, Soria, Segovia, Avila, Palencia, and Valladolid. Pop. 1,761,440.

**CASTING**, the running of melted metal into a mold prepared for the purpose, so as to produce an article of a certain shape. Iron-casting (or iron-founding) is the most important branch. In ordinary operations the pattern is laid on a board known as the turn-over board, and the flask placed over it, the sand being carefully rammed into the flask till it is full. Another board, known as the bottom-board, is then laid upon it. The flask is then turned over, the first or turn-over board taken off, the one side of the pattern uncovered, a fine facing of sand spread upon the surface to prevent adhesion, after which a second flask, called the cope, sometimes made with crossbars to strengthen it and help to hold the sand, is placed upon it and sand carefully rammed in. The cope or second flask is then lifted off, the sand which it contains carrying the impression of the upper side of the pattern; the pattern in the lower part of the flask, or drag, is then carefully drawn out, and any injuries which the mold receives during the operation is repaired. Holes or passages are then cut into the sand for pouring in the metal, all loose sand carefully removed, the cope replaced and secured to the drag by clamps. The mold is now ready for the molten metal. In pouring, the metal is generally run through two or three different passages at the same time to prevent it losing fluidity by cooling. It is only in lighter castings that sand, of the proper degree of dryness, porosity, and adhesiveness, is used. In heavy castings the mold is usually made of loam, which is more adhesive, and in complicated articles the making of the mold is often a difficult process.

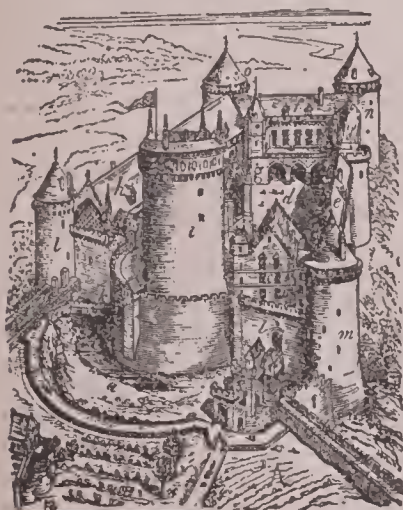
**CASTING-VOTE**, the vote of a presiding officer in an assembly or council which decides a question when the votes of the assembly or house are equally divided between the affirmative and negative.

**CAST-IRON**, the name given to the iron obtained from the blast-furnace by running the fused metal into molds prepared for the purpose. The molds are in the form of long narrow channels, from which the iron, when it has cooled and solidified, is taken in bars called pigs, between 3 and 4 feet long and 3 or 4 inches broad. See Iron.

**CASTLE**, an edifice serving at once as a residence and as a place of defense, especially such an edifice belonging to feudal times. Castles differed somewhat at different times and in different places, but they had all several features of similarity. The first defense of a castle was usually the moat or ditch,



that sometimes comprised several acres; and behind it was the outer wall, generally of great height and thickness, strengthened with towers at regular distances, and pierced with loopholes through which missiles could be discharged at the assailants. The main entrance through the outer wall was protected by the barbican, with its narrow archway, and strong gates and portcullis, and inside there were usually an outer and an inner court, and the strong more or less detached building known as the keep, which formed the residence of the owner and his family. This was the most strongly constructed of all the buildings, to which the defenders retreated only in the last extremity. The cut shows the castle of the Sires de Coucy, France, built in the 13th century. In the foreground is the outer bailey or esplanade, fortified, and containing a chapel, stables, and other buildings. The outer entrance to this was formed by the barbican. a, is the fosse, 20 yards broad; b, the gateway, approached by two swing-bridges, defended by two guard-rooms, and having a double portcullis within, giving entrance to vaulted guard-rooms with sleeping apartments, etc.,



Castle—Château de Coucy.

above, c; d, inner bailey or courtyard; e, covered buildings for the men defending the walls or curtains; f, apartments for the family, entered by the grand staircase, g; h, great hall, with store-rooms and vaults below; i, donjon or keep (the chapel is seen behind it), the strongest part of the castle, with walls of immense thickness. At k was a postern leading from the donjon and communicating with an outer postern, drawbridge, etc.; l, m, n, o, towers or bastions flanking the walls.

**CASTLE GARDEN**, a building in Battery Park, New York City, and long used as a landing place for immigrants. It is now used as a public swimming place and has a collection of salt-water and fresh-water fishes.

**CAS'TOR**, Castoreum, a reddish-brown substance, of a strong penetrating smell, secreted by two glandular sacs connected with the organs of reproduction of the beaver, and used by perfumers.

**CASTOR AND POLLUX**, in Greek mythology, twin divinities, sons of Zeus (Jupiter) and Leda, also called Dioscūri (sons of Zeus). Castor was mortal, but Pollux was immortal. The former was particularly skilled in breaking horses, the latter in boxing and wrestling. They were the patron deities of mariners. In the heavens they appear as one of the twelve constellations of the zodiac, with the name of Gemini (the Twins).

**CASTOR AND POLLUX** are two minerals which are found together in granite in the island of Elba. Castor is a silicate of aluminium and lithium, pollux is a silicate of aluminium and the rare element cæsium.

**CASTOR-OIL**, the oil obtained from the seeds of a plant, a native of India, but now distributed over all the warmer regions of the globe. The oil is obtained from the seeds by bruising and pressing.



Castor-oil plant.

The oil that first comes away, called cold-drawn castor-oil, is reckoned the best; an inferior quality being obtained by heating or steaming the pressed seeds, and again subjecting them to pressure. The oil is afterward heated to the boiling point, which coagulates and separates the albumen and impurities. Castor-oil is used medicinally as a mild but efficient purgative. It is chiefly imported from India. The plant is often cultivated as an ornamental plant.

**CASTRATION**, the act of depriving a male animal of the testicles. It is practiced on domestic animals (as oxen and horses) with the object of rendering them more submissive and docile, etc. Men who are castrated are known as eunuchs.

**CAST-STEEL**, steel made by fusing the materials and running the product into molds.

**CAS'UISTRY**, that part of the old theology and morals which relates to the principles by which difficult cases of conscience (especially where there is a collision of different duties) are to be settled. Hence a casuist is a moralist who endeavors to solve such doubtful question.

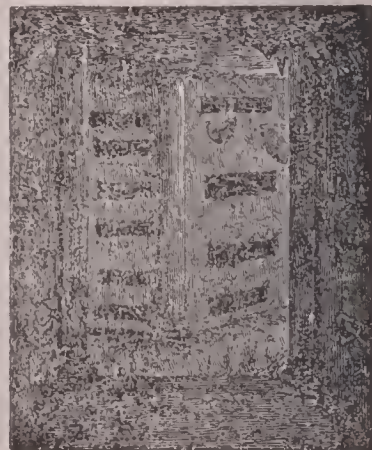
**CASUS BELLI**, the material grounds which justify a declaration of war.

**CAT**, a well-known domesticated quadruped, order Carnivora, the same name being given also to allied forms of the same order. It is believed that the cat was originally domesticated in Egypt, and the gloved cat of Egypt and Nubia has by some been considered the original stock of the domestic cat,

though more probably it was the Egyptian cat. It was seldom, if at all, kept by the Greeks and Romans, and till long after the Christian era was rare in many parts of Europe. Some have thought that the domestic breed owed its origin to the wild cat; but there are considerable differences between them, the latter being larger, and having a shorter and thicker tail, which also does not taper. The domestic cat belongs to a genus—that which contains the lion and tiger—better armed for the destruction of animal life than any other quadrupeds. The short and powerful jaws, trenchant teeth, cunning disposition, combined with nocturnal habits (for which their eyesight is naturally adapted) and much patience in pursuit, give these animals great advantages over their prey. The cat in a degree partakes of all the attributes of her race. Its food in a state of domestication is necessarily very various, but always of flesh or fish if it can be obtained. Instances of its catching the latter are known, though usually the cat is extremely averse to wetting itself. It is a very cleanly animal, avoiding to step in any sort of filth, and preserving its fur in a very neat condition. Its fur is very easily injured by water on account of the want of oil in it, and it can be rendered highly electric by friction. The cat goes with young for sixty-three days, and brings forth usually from three to six at a litter, which remain blind for nine days. It is usually regarded as less intelligent than the dog, but this is by no means certain. It has a singular power of finding its way home when taken to a distance and covered up by the way.

**CAT'ACLYSM**, in geol. a physical catastrophe of great extent, supposed to have occurred at different periods, and to have been the efficient cause of various phenomena observed in the surface configuration of localities.

**CAT'ACOMBS**, (a hollow or recess), caves or subterranean places for the burial of the dead, the bodies being placed in graves or recesses hollowed out in the sides of the cave. Caves of



Catacomb of St. Agnes, Rome.

this kind were common among the Phœnicians, Greeks, Persians, and many oriental nations. In Sicily and Asia Minor numerous excavations have been discovered containing sepulchers, and the catacombs near Naples are remarkably extensive. Those of Rome, how-



ever, are the most important. The term *catacumbæ* is said to have been originally applied to the district near Rome which contains the chapel of St. Sebastian, in the vaults of which, according to tradition, the body of St. Peter was first deposited; but (besides its general application) it is now applied in a special way to all the extensive subterranean burial-places in the neighborhood of Rome, which extend underneath the town itself as well as the neighboring country, and are said to contain not less than 6,000,000 tombs. They consist of long narrow galleries usually about 8 feet high and 5 feet wide, which branch off in all directions, forming a perfect maze of corridors. Different stories of galleries lie one below the other. Vertical shafts run up to the outer air, thus introducing light and air, though in small quantity. The graves lie longwise in the galleries. They are closed laterally by a slab, on which there is occasionally a brief inscription or a symbol, such as a dove, an anchor, or a palm-branch, and sometimes both. The earliest that can be dated with any certainty belongs to the year 111 A.D. It is now regarded as certain that in times of persecution the early Christians frequently took refuge in the catacombs, in order to celebrate there in secret the ceremonies of their religion; but it is not less certain that the catacombs served also as ordinary places of burial to the early Christians, and were for the most part excavated by the Christians themselves.

**CAT'ACOUSTICS**, the science of reflected sounds, or that part of acoustics which considers the properties of echoes.

**CATAFAL'CO**, Catafalque, a temporary and ornamental structure, representing a tomb placed over the coffin of a distinguished person or over a grave.

**CATALEP'SY**, a spasmodic disease, generally connected with hysteria, in which there is a sudden suspension of the senses and volition, with statue-like fixedness of the body and limbs in the attitude immediately preceding the attack, while the action of the heart and lungs continues, and the pulse and temperature remain natural. It is generally the consequences of some other disease, or of a constitution enfeebled by the gradual operation of unobserved causes.

**CATALOGUING**, the art of making classified lists of books, or other things. Book catalogues, especially those of large libraries have been superseded by card indexes, although catalogues are still used by libraries for the purpose of distribution to other libraries. Catalogues are made in a systematic manner by name of author and subject each "crossed" with the other.

**CATALO'NIA**, an old province of Spain, bounded n. by France, e. and s.e. by the Mediterranean, s. by Valencia, and w. by Arragon. The country in general is mountainous, but intersected with fertile valleys, while the mountains themselves are covered with valuable woods and fruit-trees, the slopes being cut in terraces and plentifully supplied with water by an artificial system of irrigation. Wheat, wine, oil,

flax, hemp, vegetables, and almost every kind of fruit are abundant. There are mines of lead, iron, alum, etc. On the coast is a coral-fishery. Catalonia, though less fertile than most of Spain, stands pre-eminent for the industry of its inhabitants, who speak the Catalan dialect (see Catalan). Pop. 1,942,245; area, 12,480 sq. miles. It comprises the modern provinces of Tarragona, Gerona, Lerida, and Barcelona.

**CATAL'PA**, a genus of plants. The species are trees with simple leaves and large, gay, trumpet-shaped flowers. A North American species, is well adapted for large shrubberies, and has been introduced into England and other parts of Europe.

**CATAL'YSIS**, or **CONTACT ACTION**, the chemical change which occurs when one body decomposes another without being itself changed; thus oxide of cobalt decomposes a solution of bleaching-powder into chloride of calcium and oxygen, itself remaining without change.



The square of the elephant, Catania.

**CATAMARAN'**, a sort of raft used in the East Indies, Brazil, and elsewhere. Those of the island of Ceylon, like those of Madras and other parts of that coast, are formed of three logs lashed together. Their length is from 20 to 25 feet, and breadth  $2\frac{1}{2}$  to  $3\frac{1}{2}$  feet. The center log is much the largest, and is pointed at the fore-end. These floats are navigated with great skill by one or two men in a kneeling posture. They think nothing of passing through the surf which lashes the beach at Madras when boats of the best construction would be swamped.

**CATAMAR'CA**, a province of the Argentine Republic, S. America; area, about 31,500 sq. miles; mountainous in all directions except the s. Pop. 102,000. The capital is Catamarca, or more fully San Fernando de Catamarca. Pop. about 6000.

**CAT'AMOUNT**, or **CATAMOUNTAIN**, the wild cat. In America the name is also given to the tiger or the puma.

**CATA'NIA**, a city on the east coast of Sicily, in the province of Catania, at the foot of Mount Etna. It has been repeatedly visited by tremendous earthquakes, one of the worst of which was in 1693, when 18,000 people were destroyed and has been partially laid in ruins by lava from eruptions of Mount Etna. Most of the edifices have an air of mag-

nificence unknown in other parts of the island, and the town has a title to rank among the elegant cities of Europe. The ruins of the amphitheater, which was more extensive than the Colosseum at Rome, are still to be seen, as also the remains of the theater, baths, aqueducts, sepulchral chambers, hippodrome, and several temples. The harbor was choked up by the eruption of 1669, but latterly has been greatly improved. The trade is of some importance, the chief exports being sulphur, oranges, and lemons, grain, wine, oil, etc. Pop. 113,391.

**CATANZA'RO**, a cathedral city, South Italy, capital of province of the same name, on a height, 5 miles from the Gulf of Squillace, with manufactures of silk and velvet and some trade in wheat, wine, oil, etc. Pop. 20,931. Area of prov. 2307 sq. miles; pop. 433,975.

**CAT'APULT**, a machine of the ancients for projecting missiles, chiefly arrows. They may be described as a

kind of gigantic cross-bows. Balistæ were engines somewhat similarly constructed, but were chiefly confined to the shooting of stones.

**CAT'ARACT**, a disease of the eye, consisting in an opacity of the crystalline lens, or its capsule, or both. It is quite different from amaurosis, which is a disease of the retina. In cataract the lens becomes opaque, and is no longer capable of transmitting the light. Its earliest approach is marked by a loss of the natural color of the pupil, and when developed it causes the pupil to have a milk-white or pearly color. It is most common in old or elderly people, and is quite painless. Cataract is treated by different surgical operations, all of them consisting in removing the diseased lens from its situation opposite the transparent cornea. In couching, the lens is depressed, removed downward, and kept from rising by the vitreous humor; but this method is now almost entirely given up in favor of removal of the lens by extraction. Extraction consists in making an incision in the cornea, and in the capsule of the lens, by which the lens may be brought forward, and through the cut in the cornea, so as to be altogether removed. The third operation is by absorption. This consists in wounding the capsule,



## CATARACT, OR WATERFALL

breaking down the crystalline, and bringing the fragments into the anterior chamber of the eye, where they are exposed to the action of the aqueous humor, and are at length absorbed and disappear. Extraction is now the regular method, and after it is effected a special kind of spectacles are required.

**CAT'ARACT**, or **WATERFALL**, the leap of a stream over a ledge or precipice occurring in its course. Many cataracts are remarkable for their sublimity, the grandest being the Falls of Niagara, on the Niagara River between Lakes Erie and Ontario, in N. America, the river having here a fall of about 160 feet. Among other notable falls are those of the river Montmorency, a tributary of the St. Lawrence, which are 242 feet in height; that of the river Potaro, in British Guiana, about 822 feet high and 369 broad; that of the Yosemite River, California, which makes a perpendicular leap of 2100 feet; the Victoria Falls, on the river Zambesi, in south Africa, about 370 feet high and 1860 yards broad. The cataract of the Riukanfoss, on the river Maan, in Norway, is about 900 feet high. The cascade of Gavarnie, in the Pyrenees, is reputed the loftiest in Europe, being about 13,000 feet, but its volume is so small that it is converted into spray before reaching the bottom. The fall of the Staubbach at Lauterbrunnen, in Switzerland, is between 800 and 900 feet, but has also a very small volume of water; the falls of the Rhine at Schaffhausen, renowned over Europe, are 300 feet broad and nearly 100 feet in height. In Italy the falls of Terni, on the Velino, and those of the Anio, at Tivoli, are artificial but very beautiful. Among British waterfalls, the falls of the Clyde, three in number, viz., Bonniton Linn, 30 feet, Corra Linn, 84 feet, and Stonebyres Linn, 80 feet, are remarkable for their beauty and grandeur.

**CATARRH** (ka-tar'), an increased secretion of mucus from the membranes of the nose, fauces, and bronchi, accompanied with fever and attended with sneezing, cough, thirst, lassitude, and want of appetite. There are two species of catarrh, one which is very common, and is called a cold in the head; and another, the influenza, or epidemic catarrh. It is seldom fatal except in scrofulous habits by laying the foundation of consumption.

**CAT-BIRD**, a well-known species of American thrush, which during the summer is found throughout the Middle and New England States, frequenting thickets and shrubberies. Its note is strikingly similar to the plaint of a kitten in distress. The plumage is a deep slate-color above and lighter below, and it is about 9 inches in length. In habit it is lively, familiar, and unsuspicious; the song is largely imitative of those of other birds. During the winter it inhabits the extreme south of the U. States, and is found also in Mexico and Central America. The cat-bird frequently attacks the common black snake, which, in the absence of the bird, rifles its nest.

**CAT-BOAT**, a sailboat with one large fore-and-aft sail, and generally not

longer than 25 or 30 feet. Cat-boats are fast sailers and easily managed.

**CATECHISM** (kat'e-kizm), an elementary book containing a summary of principles in any science or art, but particularly in religion, reduced to the form of questions and answers.

**CAT'ECU** (-shö), a name common to several astringent extracts prepared from the wood, bark, and fruits of various plants. Catechu is one of the best astringents in the materia medica. It consists chiefly of tannin, and is used in tanning, in calico-printing, etc. It is chiefly obtained from Burmah.

**CATERPILLAR**. See Butterfly.

**CAT-FISH**, a remarkably voracious fish, belonging to the family of gobies, known also as the wolf-fish; also the name common to several N. American fish. The common cat-fish is known also as the horned pout and bull-head. It is excellent eating.

**CAT'GUT**, a cord made from the intestines of sheep, and sometimes from those of the horse, ass, and mule, but not from those of cats. The manufacture is chiefly carried on in Italy and France by a tedious process. Catgut for stringed instruments, as violins and harps, is made principally in Milan and Naples, the latter having a high reputation for treble strings.

**CATHARINE I.**, Empress of Russia and wife of Peter the Great, was a woman of humble origin, who, having become mistress to Prince Menshikoff, was relinquished by him to the czar. In 1708 and 1709 she bore the emperor the Princesses Anna and Elizabeth, the first of whom became the Duchess of Holstein by marriage, and mother of Peter III. The second became Empress of Russia. In 1711 the emperor publicly acknowledged Catharine as his wife, and she was subsequently proclaimed empress, and crowned in Moscow in 1724. When Peter with his army seemed irreparably lost on the Pruth in 1711 Catharine secured the relief of her husband by bribing the Turkish general. At Peter's death in 1725 Catharine was proclaimed empress and autocrat of all the Russias, and the oath of allegiance to her was taken anew. Catharine died suddenly in 1727, her death having been hastened by dissipation.

**CATHARINE II.**, Empress of Russia, was born in 1729, her father being Christian Augustus, prince of Anhalt-Zerbst. In 1745 she was married to Peter, nephew and successor of the Russian Empress Elizabeth, on whose death in 1762 her husband succeeded as Peter III. In danger of being supplanted by his mistress, the Countess Woronzoff, Catharine, with the assistance of her lover, Gregory Orloff, and others, won over the guards and was proclaimed monarch (July, 1762). Peter attempted no resistance, abdicated almost immediately, and was strangled in prison a few days later, apparently without Catharine's knowledge. On the death of Augustus III. of Poland she caused her old lover, Poniatowski, to be placed on the throne with a view to the extension of her influence in Poland, by which she profited in the partition of that country in the successive dismemberments of 1772, 1793, and 1795. By

## CATHARINE DE' MEDICI

the war with the Turks, which occupied a considerable part of her reign, she conquered the Crimea and opened the Black Sea to the Russian navy. Her dream, however, of driving the Turks from Europe and restoring the Byzantine Empire was not to be fulfilled. Her relations with Poland and with other European powers induced her to make peace with Turkey in 1792, and accept the Dniester as the boundary line be-



Catharine II of Russia.

tween the two countries. She appears to have been successful in improving the administration of justice, ameliorated the condition of the serfs, constructed canals, founded the Russian Academy, and in a variety of ways contributed to the enlightenment and prosperity of the country. Her enthusiasm for reform, however, was summarily checked by the events of the French revolution; and the dissipation and extravagance of her court were such that there was even a danger of its exhausting the empire. She died in 1796.

**CATHARINE**, St., in the Roman hagiology there are six saints of this name, of whom only two are of importance:—(1) St. Catharine, a virgin of Alexandria who suffered martyrdom in the 4th century. She is represented with a wheel; and the legend of her marriage with Christ has been painted by several of the first masters. (2) St. Catharine of Siena, born in 1347, who was preternaturally pious from her birth, and at six years of age was given to self-castigation and other penances. Urban VI. and Gregory XI. sought her advice, and in 1460—80 years after her death—she was canonized. Her poems and letters have been published.

**CATHARINE DE' MEDICI** (dā-med'i-chē), wife of Henry II., king of France, born at Florence in 1519, the only daughter of Lorenzo de' Medici, duke of Urbino, and the niece of Pope Clement VII. She was married to the Duke of Orleans, afterward Henry II., in 1533, but had little or no influence at the French court either during the reign of her husband, who was under the influence of his mistress Diana de Poitiers, or during the reign of her eldest son, Francis II., who, in consequence of his marriage with Mary Stuart, was devoted to the party of the Guises. The death of Francis placed the reins of government during the minority of her son Charles IX., in her hands. Waver-



ing between the Guises on one side, who had put themselves at the head of the Catholics, and Condé and Coligny on the other, who had become very powerful by the aid of the Protestants, she played off one faction against the other in the hope of increasing her own power; and the thirty years of civil war which followed were mainly due to her. Her influence with Charles IX. was throughout of the worst kind, and the massacre of St. Bartholomew's Day was largely her work. After the death of Charles IX., in 1574, her third son succeeded as Henry III., and her mischievous influence continued. She died in 1589, shortly before the assassination of Henry III. Of her two daughters, Elizabeth married Philip II. of Spain, and Margaret of Valois married Henry of Navarre, afterward Henry IV.

**CATHARINE HOWARD**, Queen of England, fifth wife of Henry VIII., daughter of Lord Edmund Howard, son of the Duke of Norfolk; born 1522. Her beauty and vivacity induced the king to marry her in 1540, but her conquest appears to have been of a dubious kind both before and after marriage, and she was charged in 1541 with adultery. Her paramours Derham and Culpepper were beheaded, and two months later (Feb., 1542), she shared the same fate.

**CATHARINE OF ARAGON**, Queen of England, the youngest daughter of Ferdinand of Aragon and Isabella of Castile, was born in 1485. In 1501 she was married to Arthur, prince of Wales, son of Henry VII. Her husband dying about five months after, the king, unwilling to return her dowry, caused her to be contracted to his remaining son, Henry, and a dispensation was procured from the pope for that purpose. On his accession to the throne as Henry VIII. in 1509 she was crowned with him, and despite the inequality of their ages retained her ascendancy with the king for nearly twenty years. Her children, however, all died in infancy, excepting Mary, and on the advent of Anne Boleyn Henry affected to doubt the legality of his union with Catharine. He applied therefore to Rome for a divorce, but the attitude of the papal court ultimately provoked him to throw off his submission to it, and declare himself head of the English church. In 1532 he married Anne Boleyn; upon which Catharine, no longer considered queen of England, retired to Ampthill in Bedfordshire. She died in January, 1536.

**CATHARINE OF BRAGANZA**, wife of Charles II., king of England, and daughter of John IV., king of Portugal, was born in 1638. In 1693 she returned to Portugal, where, in 1704, she was made regent, and in the conduct of affairs during the war with Spain showed marked ability. She died in 1705.

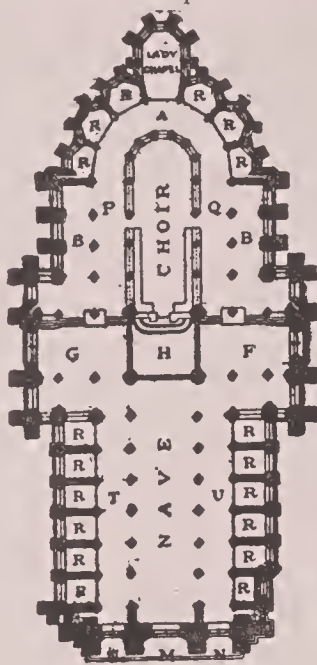
**CATHARINE PARR**, sixth and last wife of Henry VIII. of England, was born in 1512, and had had two husbands before she became Henry's queen in 1543. After the death of the king she espoused the Lord-admiral Lord Thomas Seymour, uncle to Edward VI.; but the union was an unhappy one. She died in 1548.

**CATHARTICS**, a general name for purgative medicines.

**CATHAY**, an old name of China.

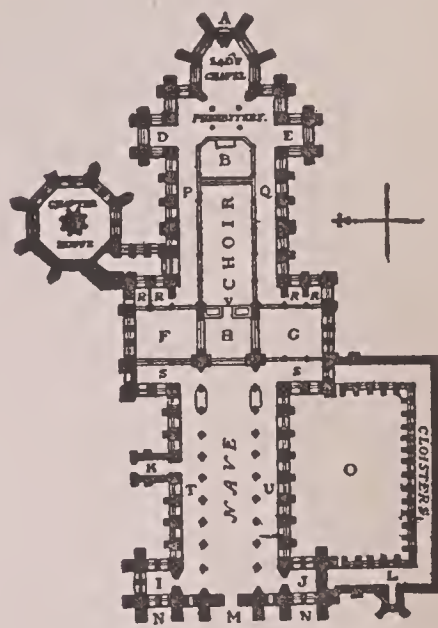
**CATHE'DRAL**, the principal church of a diocese, so called from its possessing the episcopal chair or cathedra. This is really what distinguishes a cathedral from other churches, though most cathedrals are also larger and more elaborate structures than ordinary churches, and have various dignitaries and functionaries connected with them. The cathedral establishments in England regularly consist of a dean and chapter, presided over by the bishop, the chapter being composed of a certain number of canons. The dean and chapter meet in the chapter-house of the

often of great size (St. Peter's, Rome, is 613 feet long and 450 across the transepts). Among the most notable cathedrals are St. Peter's, the largest of all, founded 1450; the cathedral at Milan, founded in 1386, built of white marble; the cathedral at Florence, begun about 1294, one of the finest specimens of the Italian-Gothic style; Cologne Cathedral, commenced in 1248 (and only finished recently); Notre Dame at Paris begun 1163; and those of Amiens, Chartres, and Rheims. The most noteworthy English cathedrals are St. Paul's, London (1675-1711), in the Renaissance style, and those of Canterbury, Ely, Exeter, Lichfield, Lincoln, Norwich, Salisbury, Wells, Westminster, and



Plan of Amiens Cathedral.

A, Apsidal aisle. BB, Outer aisles of choir.  
FG, Transepts. H, Central tower.  
IJ, Western turrets.  
M, Principal or western doorway.  
NN, Western side doors.  
PQ, North and south aisles of choir.  
RRR, Chapels.  
TU, North and south aisles of nave.



Plan of Wells Cathedral.

A, Apse or apsis. B, Altar, altar-platform, and altar-steps. DE, Eastern or lesser transept. FG, Western or greater transept. H, Central tower. IJ, Western towers. K, North porch. L, Library or register. M, Principal or western doorway. NN, Western side doors. O, Cloister yard or garth. PQ, North and south aisles of choir. RS, East and west aisles of transept. TU, North and south aisles of nave. RR, Chapels. V, Rood screen or organ loft. W, Altar of Lady chapel.

cathedral; in them the property of the cathedral is vested, and they nominally elect the bishop on a *congé d'élire* from the crown. There are often a certain number of honorary canons, also "minor canons" who assist in the performance of the choral services, choristers, etc. As regards architecture cathedrals naturally vary much. Those in England are almost all in the Gothic style, cruciform or cross-shaped in arrangement, and having connected with them a chapter-house, side chapels (varying in number and position), cloisters, crypt, etc. This style and arrangement are also common on the continent of Europe and in most modern cathedrals; but the Romanesque, Renaissance, and Byzantine styles of architecture are also employed. Many cathedrals furnish the most magnificent examples of the architecture of the middle ages; and as they were intended to accommodate great numbers of people, and to exhibit imposing religious services, they are

York. The cathedrals of Glasgow and Kirkwall are the only entire cathedrals in Scotland, exclusive of modern edifices.

**CATHERINE**. See Catharine.

**CATHERWOOD**, Mary Hartwell, an American novelist born in Ohio in 1847, died 1902. Her stories are chiefly concerned with the early days of the Middle West.

**CATHETOM'ETER**, an instrument for measuring small differences of level between two points; in its simplest form, a vertical graduated rod, upon which slides a horizontal telescope. With the telescope the observer sights the two objects under examination, and the distance on the graduated rod moved over by the telescope is the measure of the difference of height between the two objects.

**CATH'OLIC APOSTOLIC CHURCH**. See Irvingites.

**CATHOLIC CHURCH**, the universal church, the whole body of true believers in Christ; but the term is often used as



equivalent to the Roman or Western Church. See Roman Catholic Church.

**CATHOLIC EMANCIPATION**, i.e., the abolition of those civil and ecclesiastical restraints to which the Roman Catholics of Great Britain, and particularly of Ireland, were once subjected. By the statutes of William III. Roman Catholics were forbidden to hold property in land, and their spiritual instructors were open to the penalties of felony; and although latterly these restrictions had not been enforced, they remained unrepealed in England until 1778. The proposal to repeal similar enactments on the Scotch statute-books was delayed by the strenuous opposition of the Protestant associations, in connection with which the Lord Gordon riots occurred. In 1791, however, a bill was passed allowing Roman Catholics who took the oath of allegiance to hold landed property, enter the legal profession, and enjoy freedom of education. In Ireland the Roman Catholics had been even more unjustly treated. Their public worship was proscribed, all offices and the learned professions were closed against them, they were deprived of the guardianship of their children, and if they had landed estates they were forbidden to marry Protestants. Burke and a strong body of followers took up their cause, and in 1792 and 1793 the worst of the disabilities were removed by the Irish parliament. Restraints on worship, education, and disposition of property were removed; they were admitted to the franchise, and to some of the higher civil and military offices, and to the honors and endowments of the Dublin University.

**CATHOLIC KNIGHTS OF AMERICA**, a Roman Catholic fraternal order founded in 1877. It is the pioneer of the Roman Catholic assessment insurance organizations, and the only one which admits women to membership on the same footing as men. There are now 600 branches in the order, with a total membership of about 25,000; it also has a uniform rank, with a membership of 2000. It has paid about \$15,500,000 to the beneficiaries of its deceased members.

**CATHOLIC MAJESTY**, a title which Pope Alexander VI. gave to the kings of Spain, in memory of the complete expulsion of the Moors from Spain in 1491 by Ferdinand of Aragon. But even before that time, and especially after the council at Toledo in 1589, several Spanish kings are said to have borne this title.

**CATHOLIC UNIVERSITY OF AMERICA**, founded at Washington, D. C., in 1887, and was opened in 1889. The faculties at present organized are those of theology, philosophy, law, and technology. Its library contains approximately 32,000 volumes, exclusive of pamphlets.

**CATHOLIC YOUNG MEN'S NATIONAL UNION**, a society of young men among Roman Catholics, organized at Newark, N. J., in 1875. It has over 50,000 members, distributed in more than 300 societies.

**CATILINE** (Lucius Sergius Catilina), a Roman conspirator, of patrician rank, born about 108 B.C. In his youth he

attached himself to the party of Sulla, but his physical strength, passionate nature, and unscrupulous daring soon gained him an independent reputation. Despite the charges of having killed his brother-in-law and murdered his wife and son, he was elected prætor in B.C. 68, and governor of Africa in 67. In B.C. 66 he returned to Rome to contest the consulship, but was disqualified by an impeachment for maladministration in his province. Urged on by his necessities as well as his ambition, he entered into a conspiracy with other disaffected nobles. The plot, however, was revealed to Cicero, and measures were at once taken to defeat it. Thwarted by Cicero at every turn, and driven from the senate by the orator's bold denunciations, Catiline fled, and put himself at the head of a large but ill-armed following. The news of the suppression of the conspiracy and execution of the ring-leaders at Rome diminished his forces, and he led the rest toward Gaul. Metellus Celer threw himself between the rebels and their goal, while Antonius pressed upon their rear, and, driven to bay, Catiline turned upon the pursuing army and perished fighting (62 B.C.).

**CATLIN**, George, a writer on the American Indians, born in Pennsylvania 1796, died 1872. After practising as a lawyer for two years he set up at New York as a portrait-painter, and in 1832 commenced special studies of Indian types, residing many years among them both in N. and S. America. In 1840 he went to Europe, and subsequently introduced three parties of American Indians to European courts. His finely illustrated works are: *Manners, Customs, and Condition of the N. American Indians* (1841); *North American Portfolio* (1844); *Eight Years' Travel in Europe* (1848); *Last Rambles Among the Indians, etc.* (1868).

**CATMINT**, or **CATNIP**, a plant of the natural order Labiate, not uncommon in England, scarce in Scotland and Ireland, and widely diffused throughout Europe, N. America, etc. It grows erect to a height of 2 or 3 feet, has whorls of rose-tinged, whitish flowers, and stalked, downy, heart-shaped leaves. It has much the same fascination for cats as valerian root.

**CATO**, Marcus Porcius, the Censor, a celebrated Roman, born 234 B.C. at Tusculum. He served his first campaign, at the age of seventeen, under Fabius Maximus, was present at the siege of Capua in 214 B.C.; and five years after fought under the same commander at the siege of Tarentum. He rose rapidly, accompanied Scipio to Sicily as quæstor in B.C. 204, became an ædile in 199, and in 198 was chosen prætor, and appointed to the province of Sardinia. Three years later he gained the consulship, and in 194 for his brilliant campaign in Spain obtained the honor of a triumph. His election to the censorship in 184 set an official seal to his efforts, the unsparing severity of which has made his name proverbial. From that year until his death, in 149, he held no public office, though zealously continuing his unofficial labors for the state. His hostility to Carthage, the destruction of which he advocated in every

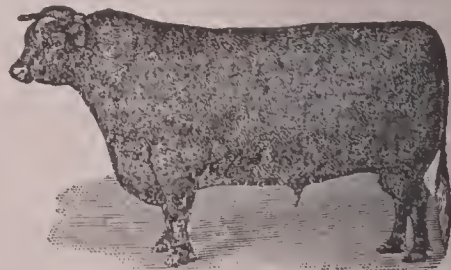
speech made by him in the forum, was the most striking feature of his closing years. His incessant "Delenda est Carthago" (Carthage must be destroyed) did much to further the third Punic war.

**CATO**, Marcus Porcius (called Cato of Utica, the place of his death, to distinguish him from the Censor, his great-grandfather), a distinguished Roman, born 95 B.C. He formed an intimacy with the Stoic Antipater of Tyre, and ever remained true to the principles of the Stoic philosophy. He distinguished himself as a volunteer in the war against Spartacus, served as military tribune in Macedonia in B.C. 67, was made quæstor in B.C. 65. His rigorous reforms won him general respect, and in B.C. 63 he was chosen tribune of the people. On the breach between Pompey and Cæsar he threw in his lot with Pompey, and guarded the stores at Dyrrhachium, while Pompey pushed on to Pharsalia. After receiving news of Pompey's defeat he sailed to Cyrene and effected a junction with Metellus Scipio at Utica, in B.C. 47. He took command of that city, but its defense appearing hopeless after the defeat of Scipio at Thapsus, he determined on suicide, and after spending some time in the perusal of the *Phædo* of Plato, stabbed himself with his sword. His wounds were bound up by his attendants, but he tore off the bandages and died, B.C. 46.

**CAT'S-EYE**, a mineral, a variety of quartz, very hard and semi-transparent, and from certain points exhibiting a yellow opalescent radiation or chatoyant appearance, somewhat resembling a cat's eye.

**CATSKILL MOUNTAINS**, a fine range of mountains in New York state. They lie on the w. side of and nearly parallel to the Hudson, from which their base is, at the nearest point, 8 miles distant. The two most elevated peaks are Round Top and High Peak; the former 3804 feet, the latter 3718 feet high.

**CATTLE**, a term applied in the U. States to horned animals, horses, and sheep, and to almost all domestic mammals. Specifically, however, the



Shorthorn.

term applies to bovine animals used for purposes of food. The principal breeds of beef cattle in Great Britain and the U. States are the Shorthorn, Hereford, Galloway, Devon, and Aberdeen-Angus. These breeds all originated in Great Britain, and for the most part took their names from the county or district whence the came. Alvord says: "The cattle which have been most famous as a breed in England and America, which have received the longest and closest



attention of breeders and improvers, which have commanded prices, singly and in herds, far above all others, and which have made the greatest impression upon the live stock of both countries during the 19th century, are the Shorthorns or Durhams." The name



Hereford.

Shorthorns was probably given to distinguish them from the rival race of Blackwell's Longhorns, which they soon surpassed. They are red and white cattle, the colors being variously blended and often roan, rectangular in outline and having horns of moderate length. They are notable for early maturity, beauty of form, quick fattening qualities and minimum amount of waste in slaughtering. Although unsurpassed as beef cattle, many of the cows are good milkers, the best of any of the strictly beef breeds. The Herefords, originated in the county of Hereford, may be described as red with white on face, chest, belly, feet, and over the tops of the shoulders. They are close rivals or the equals of Shorthorns as beef cattle. The breeds of dairy cattle most common in the U. States and England at the present time are Ayrshire, Holstein, Guernsey, Jersey, Red Poll, and Shorthorns. The Jersey and Guernsey breeds were both originated in the Channel Islands.

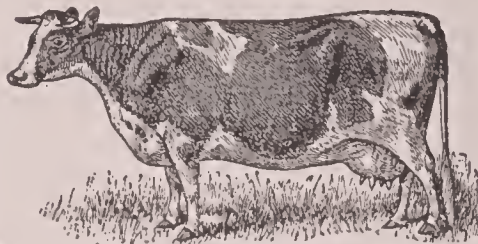
Guernseys are rather larger than the Jerseys, stronger boned, and are claimed to be hardier. They are light in color, with darker shades approaching brown,



Jersey.

and have a yellow skin. The milk of both breeds is unusually rich in fat, the fat-globules being large and separating readily in creaming. The Guernseys are liberal milkers. The average cow is expected to produce 5000 pounds of milk and 300 pounds of butter a year without high feeding. There are records of several herds which have averaged over 6000 pounds of milk and 350 pounds of butter a year. Individual cows have produced 10,000, and nearly 13,000 pounds, of milk, and 500 to 700 pounds of butter a year. The Jerseys are the smallest of the better dairy

breeds, though in the U. States they have been considerably increased in size. Good herds produce from 3500 to 4500 pounds of milk a year, and several herd records show averages of 6000 and 7000 pounds per cow. Single cows produce 1000, 1200 pounds of butter, and even more. There are numerous records of 25 to 30 pounds of butter a week, and individual records run all the way from 600 to 800, and even 1000 pounds of butter in a year. The Holsteins, or Holstein-Friesians, of north Holland and Friesland, are black and white, irregularly marked, but not mixed, large in frame, strong, and usually in good flesh. It is not unusual for a cow to give more than her own weight in milk every month for ten or twelve



Holstein.

consecutive months, and there are numerous instances of yields of 100 pounds or more a day, and 20,000 to 30,000 pounds a year, although 40 to 60 pounds a day, or 7500 to 8000 pounds a year, is considered an average.

**CATTLE PLAGUE, or MURRAIN**, a fever which attacks cattle and sheep and which is almost always fatal. It does not occur in the U. States, Texas fever, with which it is sometimes confused, being a totally different disease. The disease lasts from 5 to 7 days. Murrain is very ancient and has been described by Roman writers.

**CATULLUS**, Caius (or Quintus) Valerius, a famous Roman lyric poet, born probably B.C. 94, at Verona, died probably about B.C. 54. Almost all the known details of his life are derived by inference from his works, and relate to such matters as his passion for Lesbia, his journey to Bithynia, and voyage home in his yacht, his pleasant villa on Lake Benacus, etc. He was the first of the Romans who successfully caught the Greek lyric spirit, and gave to the Roman literature its most genuine songs.

**CAUCA** (kou'ká), a S. American river in Colombia, an important tributary of the Magdalena; length 600-700 miles. It gives its name to a department or state of Colombia; area, 52,000 sq. miles; pop. 450,000.

**CAUCASIAN RACE**, a term introduced into ethnology by Blumenbach, in whose classification of mankind it was applied to one of the five great races into which all the different nations of the world were divided. Blumenbach believed this to be the original race from which the others were derived, and he gave it the epithet of Caucasian because he believed that its most typical form—which was also that of man in his highest physical perfection—was to be met with among the mountaineers of the Caucasus. In later classifications

this "race" is usually divided into Aryan or Indo-European, and Semitic. Most of the tribes inhabiting the Caucasus belong to the Turanian class.

**CAUCASUS**, a chain of mountains which gives name to a lieutenantancy under Russian government lying to the southeast of Russia Proper, between the Black Sea and the Caspian. The total area of the lieutenantancy (including the district of Armenia, acquired in 1878) is 179,527 sq. miles, and the pop. about 5,900,000. The Caucasus chain of mountains traverses the lieutenantancy from northwest to southeast through a length of 700 miles. It does not form a single chain, but is divided, at least for part of its length, into two, three, or even four chains, which sometimes run parallel to one another, and sometimes meet and form mountain ganglions. The heights of the chief summits are Elbruz, 18,572 feet; Koshtan-tau, 17,123; Dych-tau, 16,928; Kasbek, 16,546.

**CAUCUS**, a term, for a private meeting of citizens to agree upon candidates to be proposed for election to offices or to concert measures for supporting a party.

**CAUL**, a popular name for a membrane investing the viscera, such as the peritoneum or part of it, or the pericardium; also a portion of the amnion or membrane enveloping the fetus, sometimes encompassing the head of a child when born. This caul was supposed to predict great prosperity to the person born with it, and to be an infallible preservative against drowning, as well as to convey the gift of eloquence.

**CAULIFLOWER**, a garden variety of cabbage, in which cultivation has caused the inflorescence to assume when young the form of a compact fleshy head, which is highly esteemed as a table vegetable.

**CAULKING** (kăk'ing), of a ship, driving a quantity of oakum into the seams of the planks in the ship's decks or sides in order to prevent the entrance of water. After the oakum is driven very hard into these seams it is covered with hot melted pitch to keep the water from rotting it.

**CAUSALITY**, a term of metaphysics which designates in general the idea of cause. See Cause.

**CAUSE**, that which produces an effect; that from which anything proceeds and without which it would not exist. In the system of Aristotle the word rendered by cause and its equivalents in modern language has a more extensive signification. He divides causes into four kinds: efficient, formal, material, and final. The efficient or first cause is the force or agency by which a result is produced; the formal, the means or instrument by which it is produced; the material, the substance from which it is produced; the final, the purpose or end for which it is produced. In a general sense the term is used for the reason or motive that urges, moves, or impels the mind to act or decide.

**CAUSTIC**, a name given to substances which have the property of burning, corroding, or disintegrating animal matter; or of combining with the principles of organized substances and



destroying their texture.—Lunar Caustic, a name given to nitrate of silver when cast into sticks for the use of surgeons, etc.—Caustic potash, the hydrate of potassium.—Caustic soda, protoxide of sodium.

**CAUSTIC**, in optics, the name given to the curve to which the rays of light, reflected or refracted by another curve, are tangents.

**CAUTERY**, in surgery, the searing or burning of living flesh by a hot iron (actual cautery) or a caustic substance (potential cautery).

**CAUTION**, a legal term signifying much the same as guarantee or security, now mostly used in Scots law.

**CAVAIGNAC** (ká-van-yák), Louis Eugène, French general, born 1802, died 1857. Cavaignac in 1824 joined the 2d Regiment of Engineers, and being at Arras on the outbreak of the revolution of 1830 he was the first officer in his regiment to declare for the new order of things. In 1832 he was sent to Africa, where he remained for several years, and greatly distinguished himself. When the revolution of 1848 broke out Cavaignac was appointed governor-general of Algeria; but on being elected a member of the Constituent Assembly he returned to Paris and was appointed minister of war. At the outbreak of the June insurrection Cavaignac was appointed dictator with unlimited powers. For three days Paris presented a dreadful scene of tumult and bloodshed. About 15,000 persons perished, and property was destroyed to the value of upward of \$1,000,000. By the energy of Cavaignac, aided by the loyalty of the army and the National Guard, the insurrection was suppressed, and France saved from a threatened dissolution of all the bonds of society. Toward the close of the year he became a candidate for the presidency of the republic, but was defeated, and Louis Napoleon was preferred to the office. On 20th December he resigned his dictatorship. After the coup d'état of 2d December, 1851, he was arrested and conveyed to the fortress of Ham, but was liberated after about a month's detention. In 1852 and in 1857 he was elected member for Paris of the legislative body, but on both occasions was incapacitated from taking his seat by refusing to take the oath of allegiance to the emperor.

**CAVALIER** (ka-va-lër'), a horseman, especially an armed horseman; applied in history to the partisans of Charles I., as opposed to Roundheads, the adherents to the parliament.

**CAVALRY**, a body of troops which serve on horseback, one of the three great classes of troops, and a formidable power in the hands of a leader who knows how to employ it with effect. Its adaptation to speedy movements is a great advantage, which enables a commander to avail himself immediately of a decisive moment, when the enemy exposes a weak point, or when disorder appears in his ranks. It is a very important instrument in completing the defeat of an enemy, in disconcerting him by a sudden attack, or overthrowing him by a powerful shock. It is very serviceable in protecting the wings and

center of an army, for escorts, for blockading, for intercepting the supplies, of the enemy, for procuring intelligence, for covering a retreat, for foraging, etc.

**CAVALRY AND LIGHT ARTILLERY SCHOOL**, a school for officers of the cavalry and light artillery arms of the United States Army. The curriculum of the school includes all that pertains to the art and science of war, so far as regards the cavalry and artillery. Improvements in equipment and tactics, or the application of new principles affecting either branch of the service, are here tested, reported upon, and formulated to the army at large. The school is located at Fort Riley, Kan., and is governed by special regulations of the War Department.

**CAV'AN**, an inland Irish county in Ulster; area, 477,399 acres, of which three-fourths are arable. Pop. 97,368.

**CAVE**, or **CAVERN**, an opening of some size in the solid crust of the earth beneath the surface. Caves are principally met with in limestone rocks, sometimes in sandstone and in volcanic rocks. Some of them have a very grand or picturesque appearance, such as Fingal's Cave in Staffa; others, such as the Mammoth Cave of Kentucky, which incloses an extent of about 40 miles of subterranean windings, are celebrated for their great size and subterranean waters. Caves in which the bones of extinct animals are found owe their origin, for the most part, to the action of rain-water on limestone rocks. The deposit contained in them usually consists of clay, sand, and gravel combined. In this are embedded the animal remains, and stones either angular or rounded. Some of the remains found in European caverns belong to animals now found only in the tropical or subtropical regions, and others are the remains of animals now living in more northerly areas; others, again, are the relics of extinct animals. Among the latter class of animals are the cave bear and lion, the mammoth and mastodon, species of rhinoceros, etc. Of others that have only migrated may be mentioned the reindeer, which is no longer found in Southern Europe; and the hyena, found in the Gibraltar caves, which now lives in south Africa. The ibex, the chamois, and a species of ground squirrel, are shown to have once lived in the Dordogne, but are now found only on the heights of the Alps and Pyrenees. Thus it is evident that the geographical conditions of the country must have been very different from what they are now. Man's relation to these extinct animals, and his existence at the time these changes took place, are demonstrated by such discoveries as those of human bones and worked flints beneath layers of hyena droppings.

**CA'VEAT**, in law, a process in a court to stop proceedings, as to prevent the enrolment of a decree in chancery in order to gain time to present a petition of appeal to the lord-chancellor. In the U. States this name is given to a notice lodged in the patent-office by a person who wishes to patent an invention, but desires to be protected till he

has perfected it. It stands good for a year.

**CAVE-MEN**, prehistoric races who lived in caves. That they were at a low state of civilization, though possessed of some artistic faculty, is evidenced by the fact that they were ignorant of the metals, of pottery, and of agriculture, and had no domestic animals. Their chief food seems to have been the reindeer, and their manner of life was probably somewhat similar to that of the Eskimos.

**CAVENDISH**, or **CANDISH**, Thomas, an English circumnavigator in the reign of Elizabeth; born about 1555, died 1592. Having collected three small vessels for the purpose of making a pred-



Thomas Cavendish.

atory voyage to the Spanish colonies, he sailed from Plymouth in 1586, took and destroyed many vessels, ravaged the coasts of Chili, Peru, and New Spain, and returned by the Cape of Good Hope, having circumnavigated the globe in two years and forty-nine days, the shortest period in which it had then been effected. In 1591 he set sail on a similar expedition, during which he died.

**CAVIARE** (kav'i-är), the roes of certain large fish prepared and salted. The best is made from the roes of the sterlet and sturgeon, caught in the lakes or rivers of Russia.

**CAV'IDÆ**, the guinea-pig tribe. See Cavy.

**CAVITE** (ká-vē'tá), a town in the island of Luzon, one of the Philippines; situated on the Bay of Manila, about 11 miles s. w. of Manila. It gives name to a province with a pop. of 57,000. Pop. of town about 7000.

**CAVOUR** (ká-vör'), Count Camillo Benso di, a distinguished Italian statesman, was born at Turin in 1809 or 1810, died 1861. He became a member of the Sardinian Chamber of Deputies in 1849, and the following year minister of commerce and agriculture. In 1852 he became premier, and not long afterward took an active part in cementing an alliance with Great Britain and France, and making common cause with these powers against Russia, during the Crimean War. The attitude, however, thus taken by Sardinia could not fail to prove offensive to Austria. A collision, therefore, was inevitable, resulting in the campaign of 1859. The intimate connection formed at that time with France, who lent her powerful assistance in the prosecution of the war, was



mainly due to the agency of Cavour, who was accused by some on this occasion of having purchased the assistance of Napoleon III. by unduly countenancing his ambitious projects. In 1860 Garibaldi's expedition to Sicily



Count Cavour.

took place; but toward this and the subsequent movements of the Italian liberator Count Cavour was forced to maintain an apparent coldness. He lived to see the meeting of the first Italian parliament, which decreed Victor Emmanuel king of Italy.

**CA'VY**, the popular name for a genus of rodent animals, family Cavidæ, characterized by molars without roots, forefeet with five toes, hinder with three, and the absence of a tail and clavicles. They are natives of tropical America, the most familiar example of this genus being the guinea-pig.

**CAWNPORE**, a town, India, United Provinces, on the right bank of the Ganges, which is here about a mile wide, 130 miles n.w. from Allahabad, 628 miles n.w. of Calcutta, and 266 miles s.e. of Delhi. Pop. 197,170.

In 1857 the native regiments stationed here mutinied and marched off, placing

agreed to; but after the European troops had embarked in boats on the Ganges, they were treacherously fired on by the rebels; many were killed, and the remainder conveyed back to the city, where the men were massacred and the women and children placed in confinement. The approach of General Havelock to Cawnpore roused the brutal instincts of the Nana, and he ordered his hapless prisoners to be slaughtered, and their bodies to be thrown into a well. The following day he was obliged, by the victorious progress of Havelock, to retreat to Bithoor.

**CAXAMARCA**, or **CAJAMARCA** (ká-há-már'ká), a department and town, Peru; area of the department about 14,200 sq. miles; pop. 442,412. The town is situated about 70 miles from the Pacific Ocean, 280 n. Lima. Pop. 18,400.

**CAXTON**, William, the introducer of the art of printing into Britain, was born in the Weald of Kent about 1422, died at Westminster 1491. He had translated the popular mediæval romance *Le Recueil des Histoires de Troye* (Collection of the Histories of Troy), and in order to multiply copies he learned the newly-discovered art of printing. It was printed either at Cologne or Bruges about 1474, and is the earliest specimen of typography in the English language. The *Game and Playe of the Chesse*, Bruges, 1475, is the second English book printed. In 1476 he returned to England, and in 1477 printed at Westminster *The Dictes and Sayings of the Philosophers*, the first book printed in England. In fourteen years he printed nearly 80 separate books, nearly all of folio size, some of which passed through two editions, and a few through three. He was buried in the church of St. Margaret's, Westminster.

**CAYENNE PEPPER**, or **CAPSICUM**, the name given to the powder formed

of the dried and ground fruits, and more especially the seeds, of various species of *Capsicum*. It is used as a condiment to improve the flavor of food, aid digestion, and prevent flatulence. In medicine it is used as a stimulant, and is a valuable gargle for a relaxed throat. See *Capsicum*.

**CAYMAN**. See *Caiman*.

**CAYVAN**, Georgia, an American actress born at Bath, Me., in 1858. She made her debut as Hebe in *Pinafore* at Boston in 1879. In 1880 her first success as an actress was made in *Hazel Kirke*, and until her retirement in 1897 she played in various society plays and melodramas.

**CEARA** (sā-ā-rā'), a state on the northern coast of Brazil; area, 50,247 sq. miles. Pop. of state, 805,687; of town Ceara, 40,902.

**CEBU** (thā-bō'), one of the Philippine Islands, lying between Luzon and Mindanao, 135 miles long, with an extreme width of 30 miles. Sugar cultivation and the manufacture of abaca are the chief industries. Pop. 320,000. The town of Cebu, on the eastern coast of the island, the oldest Spanish settlement on the Philippines, is a place of considerable trade, and has a cathedral and several churches.

**CECIL** (ses'il), Robert, Earl of Salisbury, English statesman, second son of William Cecil, Lord Burleigh, born



William Cecil, Lord Burleigh.

about 1563. On the death of Sir Francis Walsingham he succeeded him as principal secretary, and continued to be a confidential minister of Queen Elizabeth to the end of her reign. In 1608 Lord Salisbury was made lord high-treasurer, an office which he held till his death in 1612.—William, Lord Burleigh, eminent English statesman, was the son of Richard Cecil, master of the robes to Henry VIII., and was born at Bourne, in Lincolnshire, in 1520, died 1598. He held no public office during the reign of Mary, and by extraordinary caution managed to escape persecution. On the accession of Elizabeth he was appointed privy-councillor and secretary of state, and during all the rest of his life he was at the helm of affairs. On the suppression of the northern rebellion in 1571 Elizabeth raised him to the peerage by the title of Baron Burleigh. Much of the glory of the reign of Elizabeth is due to the counsels and measures of Cecil. His character in private life was very attractive.

**CECIL'IA**, Saint, the patron saint of music, who has been falsely regarded as the inventress of the organ, and who is said to have suffered martyrdom A.D. 230, although other dates are given. In the Roman Catholic Church her festival (Nov. 22) is made the occasion of splendid music. Her story forms one of Chaucer's *Canterbury Tales*, and



Cawnpore.

themselves under the command of the Rajah of Bithoor, the notorious Nana Sahib. General Wheeler, the commander of the European forces, defended his position for some days, was at length induced to surrender to the rebels on condition of his party being allowed to quit the place uninjured. This was



Dryden in his *Alexander's Feast*, and Pope in his *Ode on St. Cecilia's Day*, have sung her praises. Raphael, Domenichino, Dolce, and Mignard, have represented her in celebrated paintings.

**CE'DAR**, a tree which forms fine woods on the mountains of Syria and Asia Minor. It is an evergreen, grows to a great size, and is remarkable for its durability. Of the famous cedars of



Cedar of Lebanon.

Lebanon comparatively few now remain, and the tree does not grow in any other part of Palestine. The most celebrated group is situated not far from the village of Tripoli, at an elevation of about 6000 feet above the sea. The circumference of the twelve largest trees here varies from about 18 to 47 feet. Cedar timber was formerly much prized, but in modern times is not regarded as of much value, perhaps from the trees not being of sufficient age. The name is given also to the deodar which is indeed regarded by many botanists as a mere variety of the cedar of Lebanon, and which produces excellent timber. It is a native of India, and is a large and handsome tree, growing in the Himalayas to the height of 150 feet, with a circumference of 30. It has wide-spreading branches, which droop a little at the extremities. The leaves are tufted or solitary, larger than those of the cedar of Lebanon and very numerous, of a dark-bluish green, and covered with a glaucous bloom. The cones are rather larger than those of the Lebanon cedar, and very resinous. The wood is well adapted for building purposes, being compact and very enduring.

**CEDAR RAPIDS**, a flourishing town in Iowa, on Red Cedar River, with large railway machine-shops and numerous industrial establishments. Pop. 30,000.

**CEILING**, the inner covering of a room, apartment, hall, or other enclosure. Ceilings may be decorated in various ways, by paintings, sculpture in bas relief, stucco, or by those curved lines called in the Pompeian style. Ceilings, especially of domes, or dome-like structures may be made in glass. Famous ceilings are those of numerous churches in Europe, as St. Mark's in Venice, and the Byzantine churches of Constantinople.

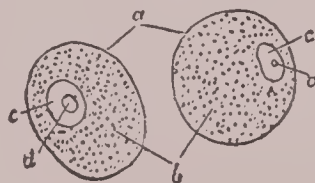
**CELEBES** (sel'e-bēz), one of the larger islands of the Indian Archipelago, between Borneo on the w. and the Moluc-

cas on the e. Gold is found in all the valleys of the north peninsula, which abounds in sulphur. Copper occurs at various points, and in Macassar tin also. Diamonds and other precious stones are found. The maritime districts are inhabited by Malays; the Peninsula of Macassar is occupied by Bugis and Macassars. Mandhars dwell in the w. of the island, and the mountainous regions in the interior, especially in the n., are inhabited by Alfoories. The inhabitants may be classed into two groups: the Mohammedan semi-civilized tribes, and the pagans, who are more or less savages. The capital is Macassar, in the s.w. of the island. Pop. estimated at 1,000,000.

**CEL'ERY**, an umbelliferous plant. There are two varieties in cultivation, viz. red and white stalked, and of these many sub-varieties. Celery is commonly blanched by heaping up the soil about the plants.

**CEL'IBACY**, the state of being celibate or unmarried; specially applied to the voluntary life of abstinence from marriage followed by many religious devotees and by some orders of clergy, as those of the Roman Catholic Church. The ancient Egyptian priests preserved a rigid chastity; the priestesses of ancient Greece and Rome were pledged to perpetual virginity; and celibacy is the rule with the Buddhist priests of the East. Among Christians the earliest aspirants to the spiritual perfection supposed to be attainable through celibacy were not ecclesiastics as such, but hermits and anchorites who aimed at superior sanctity. During the first three centuries the marriage of the clergy was freely permitted, but by the Council of Elvira (305) continence was enjoined on all who served at the altar. For centuries this subject led to many struggles in the church, but was finally settled by Gregory VII. positively forbidding the marriage of the clergy. The Council of Trent (1593) confirmed this rule. In the Greek Church celibacy is not compulsory on the ordinary clergy. Protestants hold that there is no moral superiority in celibacy over marriage, and that the church has no right to impose such an obligation on any class of her ministers.

**CELL**, a term of various applications. (1) Ecclesiastically, it was sometimes applied to a lesser or subordinate religious house, dependent upon a greater. The apartments or private dormitories



Cells of round or oval form.

a, Border of the cell or cell-wall; b, cell substance; cc, nuclei; dd, nucleoli.

of monks and nuns are also called cells. The term cell is applied also to the part of the interior of a temple where the image of a god stood. (2) In electricity the term is applied to a single jar, bath, or division of a compound vessel, containing a couple of plates, generally

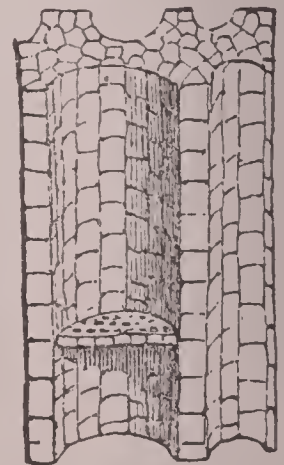
copper and zinc, united to their opposites or to each other, usually by a wire. (3) In biol. a cell is a microscopically small semi-fluid portion of matter, consisting of a soft mass of living, contractile, jelly-like matter, and a central structure, consisting of a small, roundish body, called the nucleus, generally more solid than the rest of the cell, and which may have within it a still more minute body, the nucleolus. The cell substance or protoplasm (see Protoplasm) which surrounds the nucleus is an albuminous substance possessing fundamental vital properties, and believed to be the starting point of all animal and vegetable organisms. The cell-wall when present consists of an alteration of the external portion of the cell body, and is not a separate structure. All cells have but a very limited duration, so the tissues are being constantly renewed.

**CELLA**, part of a temple. See Cell.

**CELLINI** (chel-lē'nē), Benvenuto, a sculptor, engraver, and goldsmith, was born at Florence in 1500, and died there in 1571 or 1572. Of a bold, honest, and open character, but vain and quarrelsome, he was often entangled in disputes which frequently cost his antagonists their lives. At the siege of Rome (if we believe his own account, given in his autobiography) he killed the Constable of Bourbon and the Prince of Orange. He was afterward imprisoned on the charge (probably false) of having stolen the jewels of the Papal crown, and with difficulty escaped execution. He then visited the court of Francis I. of France. He afterward returned to Florence, and under the patronage of Cosmo de' Medici made a Perseus with the head of Medusa in bronze, which is still an ornament of one of the public squares; also a statue of Christ, in the chapel of the Pitti Palace, besides many excellent dies for coins and medals.

**CELLULAR THEORY**, in physiology, that theory which derives all vegetable and animal tissues from the union and metamorphosis of primitive cells.

**CELLULAR TISSUE**, in physiology, a name for what is also called the areolar tissue. In botany, the term is applied



Cellular tissue in plants.

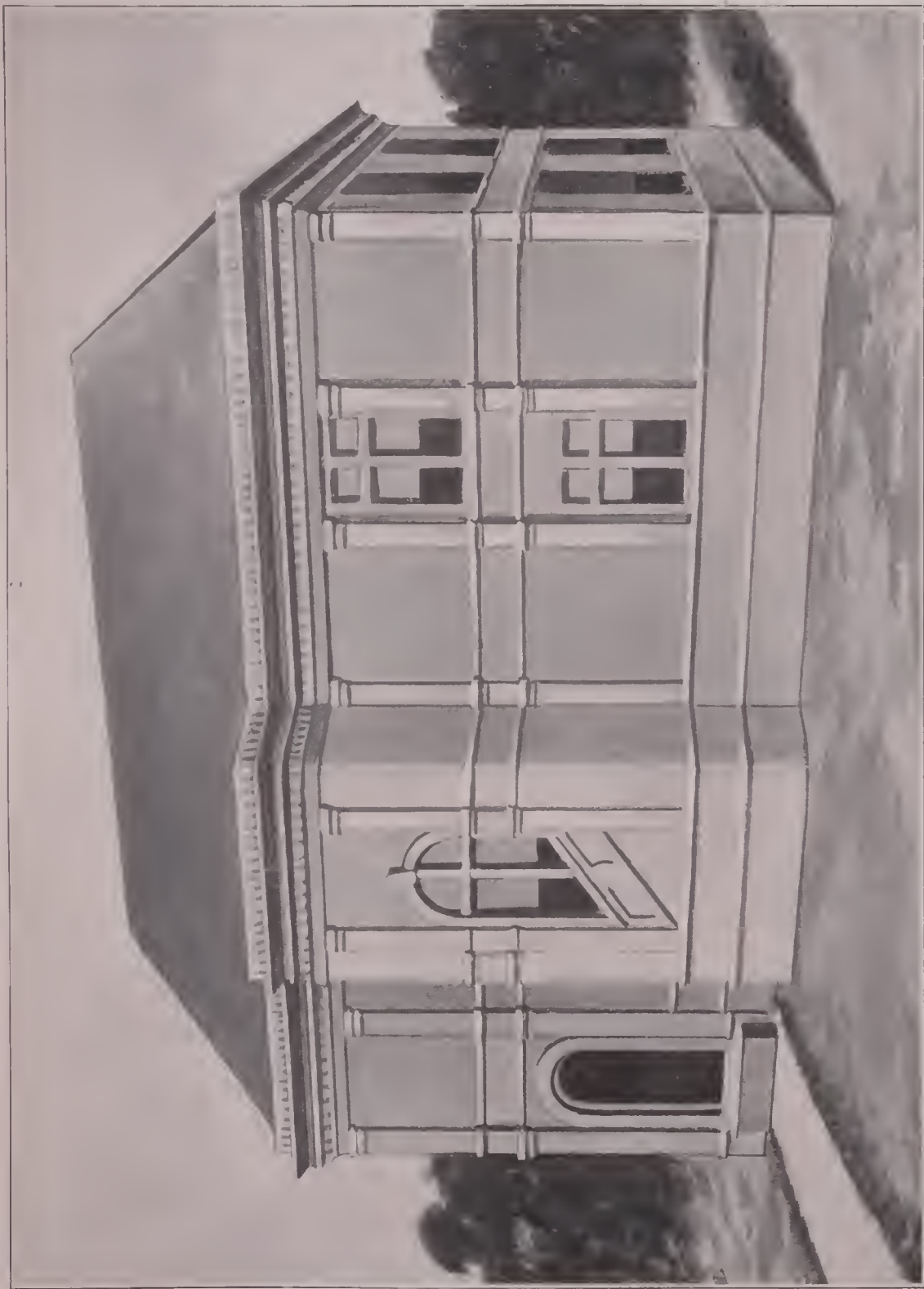
to the soft substance of plants, composed of elementary vesicles or cells without woody or vascular tissues.

**CELL'ULOID**, an artificial substance extensively used as a substitute for









#### EDISON'S CEMENT HOUSE

Thomas A. Edison regards the Cement House invented by him in 1907 as one of his greatest inventions. The house is molded in a single casting of concrete. Metallic molds are made corresponding with the designs. The mold for each house is made in detachable parts. There are separate plates and small molds that can be screwed together easily to form one mold for an entire house. The inside surfaces are nickel plated so that a fine finish may be obtained. After a mold for a house is set up, it is a simple matter to pump concrete into every nook and cranny. The pumping process requires but a few hours. After four days at the most, the parts of the mold are unscrewed and taken off and a solid concrete house remains.

The inventor says that under ordinary circumstances, the concrete villas will not cost more than from \$500 to \$600 apiece. It costs now about \$2,000 to build a frame villa of the size and with the conveniences of the concrete houses. It costs now about \$3,000 to put up a brick house of the same description. Neither a frame nor a brick house is anything near as durable as the concrete houses. To reproduce one of them in stone would cost \$25,000.



ivory, bone, hard rubber, coral, etc., having a close resemblance to these substances in hardness, elasticity, and texture. It is composed of cellulose or vegetable fibrine reduced by acids to pyroxyline (or gun-cotton), camphor is then added, and the compound moulded by heat and pressure to the desired shape. It is used chiefly for such articles as buttons, handles for knives, forks, and umbrellas, billiard-balls, backs to brushes, piano keys, napkin-rings, opera-glass frames, etc. It can be variously colored.

**CELLULOSE**, the substance of which the permanent cell-membranes of plants are always composed. It is closely allied to sugar, dextrin, or gum and starch, and is changed into the latter by heat, sulphuric acid, or caustic potash.

**CELTS**, the earliest Aryan settlers in Europe according to the common theory. They appear to have been driven westward by succeeding waves of Teutons, Slavonians, and others, but there are no means of fixing the periods at which any of these movements took place. Herodotus mentions them as mixing with the Iberians who dwelt round the river Ebro in Spain. At the beginning of the historic period they were the predominant race in Britain, Ireland, France, Belgium, Switzerland, N. Italy, Spain, and elsewhere. The Romans called them generally Galli, that is Gauls or Gael. They appear to have reached the zenith of their power in the 2d and 3d centuries B.C. Some tribes of them overrunning Greece, settled in a part of Asia Minor, to which the name of Galatia was given. They finally went down before the resistless power of Rome, and either became absorbed with the conquering races or were cooped up in the extreme n.w. of Europe. At an early date the Celts divided into two great branches, speaking dialects widely differing from each other, but doubtless belonging to the same stock. One of these branches is the Gadhelic or Gaelic, represented by the Highlanders of Scotland, the Celtic Irish, and the Manx; the other is the Cymric, represented by the Welsh, the inhabitants of Cornwall, and those of Brittany. The Cornish dialect is now extinct. The sun seems to have been the principal object of worship among the Celts, and groves of oak and the remarkable circles of stone commonly called "Druidical Circles," their temples of worship. All the old Celts seem to have possessed a kind of literary order called Bards. The ancient Irish wrote in a rude alphabet called the Ogham, later they employed the Roman alphabet, or the Anglo-Saxon form of it. The chief literature existing consists of the hymns, martyrologies, annals, and laws of Ireland, written from the 9th to the 16th centuries. The Scottish Gaelic literature extant includes a collection of MSS. in the Advocates' Library, Edinburgh, some of which date from the 12th century; the Book of the Dean of Lismore, 16th century; a number of songs from the 17th century to the present day; and the co-called poems of Ossian. The Welsh literary remains date from the 9th century, and consist of glossaries, grammars, annals, gene-

alogies, histories, poems, prose tales, etc.

**CEMENTS**, the general name for glutinous or other substances capable of uniting bodies in close cohesion. In building the name is given to a stronger kind of mortar than that which is ordinarily used, consisting of those hydraulic limes which contain silica and therefore set quickly. Cements are variously composed, according to the nature of the surfaces to which they are applied and their exposure to heat or moisture. Hydraulic or water cements harden under water and consolidate almost immediately on being mixed. Of this kind are the Roman and Portland cements.

**CEMETERY**. See Burying-places.

**CENCI** (chen'chē), Beatrice, called the beautiful parricide, the daughter of Francesco Cenci, a noble and wealthy Roman (1527-98), who, according to the common story, after his second marriage, behaved toward the children of his first marriage in the most shocking manner, procured the assassination of two of his sons, on their return from Spain, and debauched his youngest daughter Beatrice. She failed in an appeal for protection to the pope, and planned and executed the murder of her father. She was beheaded 1599 and the Cenci estates confiscated.

**CENIS** (sē-nē'), Mount, a mountain belonging to the Graian Alps, between Savoy and Piedmont, 11,755 feet high. It is famous for the winding road constructed by Napoleon I. which leads over it from France to Italy, and for an immense railway tunnel, which, after nearly fourteen years' labor, was finished in 1871. The tunnel does not actually pass through the mountain, but through the Col de Fréjus, about 15 miles to the s.w., where it was found possible to construct it at a lower level. The Mount Cenis Pass is 6765 feet above the level of the sea, whereas the elevation of the entrance to the tunnel on the side of Savoy is only 3801 feet, and that on the side of Piedmont 4246 feet. The total length of the tunnel is 12,849 meters (42,145 feet, or nearly 8 miles). The total cost amounted to \$13,000,000, which was borne partly by the French and Italian governments and partly by the Northern Railway Company of Italy. The tunnel superseded a grip railway which was constructed over the mountain by Mr. Fell, an English engineer, 1864-68.

**CENSER**, a vase or pan in which incense is burned; a vessel for burning and wafting incense. Among the ancient Jews the censer was used to offer perfumes in sacrifices. Censers, called also thuribles, are still used in the Roman Catholic Church at mass, vespers, and other offices, as well as in some Anglican and other churches. They are of various forms. In Shakespeare's time the term was applied to a bottle perforated and ornamented at the top, used for sprinkling perfume, or to a pan for burning any odoriferous substance.

**CENSUS**, an enumeration of the people of a country, together with an ascertainment of all the various social and industrial facts concerning them. The first census of the United States was

taken in 1790 for the purpose of apportioning representatives. Each succeeding decade a new census is taken and the facts thus gathered are carefully correlated and published by the government. The director of the census is appointed by the president. Census taking originated with King Servius of Rome in 577 B.C.

**CENT**, Centime (sân-tēm), etc., the name of a small coin in various countries, so-called as being equal to a hundredth part of some other coin. In the U. States and in Canada the cent is the hundredth part of a dollar. In France the centime is the hundredth part of a franc. Similar coins are the centavo of Chili; and the centesimo of Italy, Peru, etc. Cents or centimes, and their equivalents, are written simply as decimals of the unit of value.

**CEN'TAURS**, in Greek myth. fabulous beings represented as half man, half horse.



Centaur.

**CEN'TENARY**, the commemoration of any event, as the birth of a great man, which occurred 100 years before.

**CENTENNIAL EXHIBITION**, an international exposition held at Philadelphia in 1876 to commemorate the Declaration of Independence. There were upward of 50,000 exhibits from all parts of the world, 13,104 exhibitors, and a total of 9,910,966 admissions. The largest number of persons attending in any one day was 274,919 on Pennsylvania Day (Sept. 28). It was the first of the great international expositions held in the U. States and marked a new era in the industrial development of the nation.

**CENTER-BOARD**, a sort of movable keel used especially in American yachts, and capable of being raised and lowered in a well extending longitudinally amidships. It tends to prevent leeway and gives the vessel greater stability when under a press of canvas.

**CENTER OF GRAVITY**, that point of a body through which the line of the resultant of the weights of all the particles composing the body always passes, whatever be the position of the body.

**CENTER OF GYRATION**, the point at which, if the whole mass of a revolving body were collected, the rotatory effect would remain unaltered.

**CENTER OF OSCILLATION**, that point of a body suspended by an axis, at which, if all the matter were concen-



trated, the oscillations would be performed in the same time.

**CENTER OF PRESSURE**, that point of a body at which the whole amount of pressure may be applied with the same effect as it would produce if distributed; specifically, in hydro-statics, that point in the side of a vessel containing a liquid, to which, if a force were applied equal to the total pressure and in the opposite direction, it would exactly balance the effort of the total pressure.

**CENTIGRADE**. See Thermometer.

**CENTIME**. See Cent.

**CEN'TIPEDE**, a term applied to various insect-like creatures having many feet, and a body consisting of numerous similar rings or segments. Those of tropical countries inflict severe and often dangerous bites. They sometimes grow to a foot in length.

**CENTRAL AMERICA**, a geographical division, including the stretch of territory from the Isthmus of Panama to the Isthmus of Tehuantepec, but by political arrangements the limits most generally assigned to it include the five republican states of Guatemala, Honduras, San Salvador, Nicaragua, and Costa Rica, with British Honduras, and the Mosquito Coast. It thus has Mexico on the n.w., Colombia on the s.e., and the Pacific Ocean and Caribbean Sea on either side. Its entire length may be about 800 miles, with a breadth varying from between 20 and 30 to 350 miles. It is generally mountainous, contains a number of active volcanoes, and on the whole is a rich and fertile, but almost totally undeveloped region. The area is about 181,500 sq. miles; the pop. 5,000,000.

**CENTRAL FALLS**, a city in Providence Co., R. I., 4 miles north of Providence on the Blackstone River, and on the New York, New Haven and Hartford Railroad. Pop. 21,717.

**CENTRAL INDIA AGENCY**, a collection of states in Hindustan, consisting of four divisions or agencies, viz.: Gwalior, Bundelkhand, Baghelkhand, and Nimar, and Malwa, under the ultimate charge of the governor-general's agent at Indore; chief states, Gwalior, Indore, Bhopal, and Rewah. These states cover an area of 78,772 sq. miles, and have a pop. of 8,628,781.

**CENTRALIZATION**, a term in a specific sense applied to a system of government where the tendency is to administer by the central government matters which had been previously, or might very well be, under the management of local authorities.

**CENTRAL PROVINCES**, an extensive British territory in India. They became a separate administration in 1861, and are under the authority of a chief commissioner. Their total area is 115,936 sq. miles, of which 86,501 sq. miles are British territory, and 29,435 the territory of native protected states, fifteen in number. In 1891 the population, including the native states, was 12,944,805 persons; in 1901 it was 11,873,029. For administrative purposes the province is divided into four commissioner-ships, Jabalpur, (Jubbulpore), Nagpur, Nerbada (Nerbudda), and Chhattisgarh.

**CENTRIFUGAL and CENTRIP'ETAL**, in bot., terms applied to two kinds of inflorescence, the former being that in which the terminal or central flower is the first to expand, as in a true cyme (examples, elder and valerian), the latter being that kind in which the lower or outer flower is the first to expand, as in spikes, racemes, umbels, and corymbs. The laburnum, hemlock, and daisy are examples.

**CENTRIFUGAL and CENTRIPETAL FORCE**. See Central Forces.

**CENTU'RION**, in the ancient Roman army, the commander of a century, or body of 100 men, but afterward an indefinite number, the sixtieth part of a legion. The rank of a centurion corresponded pretty much to that of a captain in modern armies.

**CENTURY-PLANT**, a popular name of the American aloe.

**CERAM'**, an island in the Moluccas, lying w. of New Guinea; area about 7000 sq. miles; pop. estimated at 200,000.

**CERAM'IC ART**, that department of plastic art which comprises all objects made of baked clay, as vases, cups, urns, bassi-rilievi, statuettes, etc., and including all the varieties of earthenware and porcelain which can be regarded as works of art.

**CERASTES**, a genus of African vipers, remarkable for their fatal venom, and for two little horns formed by the



*Cerastes vulgaris.*

scales above the eyes. Hence they have received the name of horned vipers. The tail is very distinct from the body.

**CER'BERUS**, in classical mythology, the dog-monster of Hades, variously described as having a hundred, fifty,



*Cerberus—Antique bronze.*

and three heads, with a serpent's tail, and a mane consisting of the heads of various snakes. He was subdued by Hercules.

**CEREALS**, a term derived from Ceres, the goddess of corn, though sometimes extended to leguminous plants, as beans, lentils, etc., is more usually and properly confined to wheat, barley, rye, oats, and other grasses, cultivated for the sake of their seed as food.

**CEREBRA'TION**, exertion or action of the brain, conscious or unconscious.

**CEREBRO-SPINAL**, pertaining to the brain and spinal cord together, looked on as forming one nerve mass.

**CEREBRUM** and **CEREBELLUM**. See Brain.

**CEREMONY**, an act done with a certain amount of solemnity, whether of a joyous, sad, indifferent nature. Ceremonial institutions are traced back to remote antiquity and have an undoubted primitive origin. That origin is doubtless of a religious nature and all living ceremonies have some association, whether obvious or not, with ancient religious fear, veneration, or piety.

**CERES** (sē'rēz), a Roman goddess, corresponding to the Greek Dēmētēr; she was the daughter of Kronos and Rhea, and the mother of Proserpine and Bacchus. She was the goddess of the earth in its capacity of bringing forth fruits, especially watching over the growth of grain and other plants. The Romans celebrated in her honor the festival of the Cerealia. Ceres was always represented in full attire, her attributes being ears of corn and poppies, and her sacrifices consisted of pigs and cows.—Also a planet discovered by M. Piazzi at Palermo, in Sicily, in 1801. It was the first discovered of the asteroids. Its size is less than that of the moon.

**CERTIFICATE**, a written attestation of the truth of a fact. Certificates are used to attest graduation from high schools (diplomas), and the law often requires certificates for the practice of trade or professions. The United States army issues certificates of merit which entitle the holder to extra pay of \$2 per month.

**CERTIORA'RI**, in law, a writ issuing out of a superior court to call up the records of an inferior court or remove a cause there depending, that it may be tried in the superior court. This writ is obtained upon the complaint of a party that he has not received justice, or that he cannot have an impartial trial in the inferior court.

**CERU'LEUM**, a blue pigment, consisting of stannate of protoxide of cobalt mixed with stannic acid and sulphate of lime.

**CERU'MINOUS GLANDS**, the glands of the ear which secrete the cerumen or wax which lubricates the passage to the tympanum and prevents the entrance of foreign matter.

**CERUSE** (sē'rus), white-lead, carbonate of lead produced by exposing the metal in thin plates to the vapor of acetic acid or vinegar. It is much used in painting, and a cosmetic is made from it.

**CERUSITE**, a native carbonate of lead, next to galena the most abundant ore of lead. When heated it decrepitates and is converted into oxide of lead.











**CERVANTES SAAVEDRA** (ther-ván'-tes sà-à-vā'drà), Miguel de, author of *Don Quixote*, born at Alcalá de Henares in 1547, and removed thence to Madrid at the age of seven. He commenced writing verses at an early age, and his pastoral Filena attracted the notice of Cardinal Acquaviva, whom he accompanied to Italy as page. In 1570 he served under Colonna in the war against the Turks and African corsairs, and in the battle of Lepanto (1571) he lost the use of his left hand. After this he joined the troops at Naples, in the service of the Spanish king, winning the highest reputation as a soldier. In 1575, while returning to his country, he was taken by the corsair Arnaut Mami, and sold in Algiers as a slave—a condition in which he remained for seven years, displaying great fortitude. In 1580 his friends and relations at length ransomed him, and, rejoining his old regiment, he fought in the naval battle and subsequent storming of Terceira. In 1583, however, he retired from service and recommenced his literary work, publishing in 1584 his pastoral *Galatea*. In the same year he married, and lived for a long time by writing for the stage, to which he contributed between twenty and thirty plays, of which two only have survived. From 1588 to 1599 he lived retired at Seville, where he held a small office. He did not appear again as an author till 1605, when he produced the first part of *Don Quixote*, a work having, as its immediate aim, the satirical treatment of the novels of chivalry then popular, but embodying at the same time human types of cosmopolitan interest, and having a profounder bearing upon life than its express object covered. In 1613 his twelve *Exemplary Novels* (his best work after *Don Quixote*), in 1614 his *Journey to Parnassus*, and in 1615 eight new dramas, with intermezzos, were published. In 1614 an unknown writer published, under the name of Alonzo Fernandez de Avelaneda, a continuation of *Don Quixote*, full of abuse of Cervantes, who thereupon published the real continuation which was the last work of his issued during his lifetime. His novel *Persiles and Sigismunda* was published after his death, which took place at Madrid on the same day as that of Shakespeare, April 23, 1616.

**CESTUS**, a leathern thong or bandage, often covered with knots and loaded



Various forms of cestus.

with lead and iron, anciently worn by Roman pugilists to increase the force of the blow.

**CETA'CEA**, an order of marine animals, surpassing in size all others in existence. They are true mammals, since they suckle their young, have

warm blood, and respire by means of lungs, for which purpose they come to the surface of the water to take in fresh supplies of air. The body is fish-like in form, but ends in a bilobate tail, which is placed horizontally, not, as in the fishes, vertically. The posterior limbs are wanting, and the anterior are converted into broad paddles or flippers, consisting of a continuous sheath of the thick integument, within which are present representatives of all the bones usually found in the fore-limb of mammals. The fish-like aspect is further increased by the presence of a dorsal fin, but this is a simple fold of integument, and does not contain bony spines. The right whale and its allies have no teeth in the adult state, their place being taken by the triangular plates of baleen or whalebone which are developed on transverse ridges of the palate, but the foetal whales possess minute teeth, which are very soon lost. The nostrils open directly upward on the top of the head, and are closed by valvular folds of integument which are under the control of the animal. When it comes to the surface to breathe it expels the air violently (popularly known as "blowing" or "spouting"), and the vapor it contains becomes condensed into a cloud, which resembles a column of water and spray. The blood-vessels in these animals break up into extensive plexuses or net-works, in which a large amount of oxygenated blood is delayed, and they are thus enabled to remain a considerable time under water. Injury to these dilated vessels leads to profuse hemorrhage, and hence the whale is killed by the comparatively trifling wound of the harpoon. The Cetacea (which are grouped broadly as Mysticeti or toothless whales; and Odontoceti, Denticeti, or toothed whales) are commonly divided into five families: (1) whalebone whales, divided into two sections: smooth whales, with smooth skin and no dorsal fin, and furrowed whales, with furrowed skin and a dorsal fin; (2) sperm-whales or cachalots, the palates of which have no baleen-plates, and which are furnished with teeth, developed in the lower jaw only; (3) a family possessing teeth in both jaws, and including the dolphins, porpoises, and narwhal; (4) a family allied to the sperm-whales, but having only a pair or two pairs of teeth in the lower jaw, a pointed snout or beak, a single blow-hole, etc.; (5) an extinct family, distinguished from all the tooth-bearing whales by the possession of molar teeth implanted by two distinct fangs, etc. The last family is exclusively confined to the Eocene, Miocene, and Pliocene periods. The manatees and dugongs, have sometimes been classified among the Cetacea, but they must be regarded as forming a separate order.

**CETEWAYO** (kech-wā'ō), a Kaffir chief or king, son of Panda, king of the Zulus. A dispute regarding lands on the frontier was settled by arbitration in favor of the Zulus; but on the refusal of Cetewayo to comply with the conditions imposed war was declared against him by the British, and the king made prisoner soon after the battle of Ulundi

(July, 1879). In 1882 he was conditionally restored to part of his dominions. In the following year he was driven from power by the chief Usibepu, and remained under the protection of the British until his death in 1884.

**CETTE** (set), a fortified seaport of France, dep. Hérault. After Marseilles, Cette is the principal trading port in the south of France, and it is much resorted to as a watering-place. Pop. 35,517.

**CEVENNES** (sè-venz'), a chain of mountains in the southeast of France. The length of the chain, exclusive of the Côte d'Or, is about 330 miles, the average height not more than 3000 feet. It is divided into two sections, the northern and southern Cevennes; the dividing point is Mount Lozère, in the department of the same name, 5582 feet high. The highest peak is Mezenc, 5753 feet. The Cevennes form the watershed between the Bay of Biscay and the Mediterranean, separating the basins of the Garonne and Loire from those of the Rhone and Saône. They are rich in minerals, containing mines of copper, iron, lead, and coal, and quarries of granite, porphyry, marble and plaster.

**CEYLON** (si-lon'), an island belonging to Great Britain in the Indian Ocean, 50 to 60 miles southeast of the southern extremity of Hindustan, from which it is separated by the Gulf of Manaar and Palk's Strait, and by a chain of sandbanks, called Adam's Bridge, impassable by any but very small vessels. Length, about 270 miles north to south; average breadth, 100 miles; area, 25,364 sq. miles. The north and northwest coasts are flat and monotonous, those on the south and east bold, rocky, and picturesque, with exuberant vegetation. The mountainous regions are confined to the center of the south and broader part of the island. Their average height is about 2000 feet, but several summits are upward of 7000 and one over 8000 feet high, the culminating point being Pidurutallagalla, 8296 feet. Adam's Peak, reaching 7420 feet, is the most remarkable from its conical form, the distance from which it is visible from the sea, and from the legend that thence Buddha ascended to heaven, leaving in evidence a gigantic footprint.

In respect of climate, where the jungle has been cleared away, and the land drained and cultivated, the country is perfectly healthy; but where low wooded tracts and flat marshy lands abound it is malarial and insalubrious. The east part of the island being exposed to the northeast monsoon has a hot and dry climate; while the west division, being open to the southwest monsoon has a temperate and humid climate.

In the luxuriance of its vegetable productions Ceylon rivals the islands of the Indian Archipelago, and in some respects bears a strong resemblance to them. Its most valuable products are tea, coffee, rice, cinnamon (which is found almost exclusively in the southwest), and the cocoa-nut palm. Coffee used to be very extensively cultivated, but disease has within recent years reduced the produce to a fraction of its former amount, and tea cultivation has taken its place, and is rapidly increasing. The island abounds with timber o



various descriptions, including ebony, satin, rose, sapan, iron, jack, and other beautiful woods adapted for cabinet work. Attention has been directed latterly to the cultivation of cinchona, cacao, and silk. The chief mineral products are iron, plumbago or graphite, and a variety of gems, including sapphires, rubies, etc. The pearl-fisheries of Ceylon are famous.

The commerce of Ceylon is now important. The exports comprise tea, coffee, plumbago, areca-nuts, cocoa-nut oil fibre and kernals (copra), cinnamon, cinchona, cacao, etc. The principal articles of import are manufactured goods, iron and steel manufactures, machinery, dried fish, rice, wheat, sugar, tea, cowries, etc. Ceylon is one of the British crown colonies, the government being conducted by a governor and two councils, executive and legislative, of both of which the governor is president. The present population of Ceylon is composed of Singhalese or Cingalese, who are the Ceylonese proper, Tamils (from India), Moormen or Moors, Malays, Veddahs, a small proportion of Europeans and their descendants, and negroes. The Singhalese are in stature rather below the middle size; their limbs slender, but well shaped, eyes dark, finely-cut features, hair long, smooth, and black, turned up and fixed with a tortoise-shell comb on the top of the head; color varying from brown to black, or rather from the lightest to the darkest tints of bronze. The general population of the island was decreasing for several centuries. It is now, however, on the increase, and latterly this increase has been rapid. In 1901 the population was 3,576,990, of whom 9583 were Europeans, and 4913 Boer prisoners of war. The Singhalese numbered 2,334,817, the Tamils 952,237. The population in 1891 was 3,008,466.

Buddhism prevails in the interior, and generally among the Singhalese of the sea-coasts. The Singhalese have a colloquial language peculiar to themselves, but their classic and sacred writings are either in Pali or Sanskrit. The Hindu religion (Brahmanism) prevails among the Tamils or population of Indian extraction, which forms a large proportion of the inhabitants of the north and northeast districts. The Tamils speak their own Tamil tongue.

The Singhalese possess a native chronicle, the Mahawanso, which records history of the island from 543 B.C. onward, under a long series of kings reigning most frequently at the ancient capital Anuradhapura, the earliest of these being leader of an invading host from India. Buddhism was introduced 307 B.C. The island was not known to Europeans till the time of Alexander the Great, and their knowledge of it was long vague and meager. Little, however, was known in Europe regarding the island until 1505, when the Portuguese established a regular intercourse with it, and latterly made themselves masters of it. When they arrived the Malabars were in possession of the north, the Moors or Arabs held all the seaports, the rest was under petty kings and chiefs. The Portuguese, who were

cruel and oppressive rulers, were subsequently expelled by the Dutch in 1658, after a twenty years' struggle. The Dutch in turn were driven from the island by the British in 1796, though a part of the island remained independent under native princes. The King of Kandy, nominally the sovereign of the island, was deposed in 1815 on account of his cruelties, and the island was then finally annexed by Britain, though a rebellion had to be put down in 1817. The principal towns are Colombo (the capital and chief port), Kandy, Galle, Jaffna, and Trincomalee.

**CHAFF'INCH**, a lively and handsome bird of the finch family. The male is 6 or 7 inches in length, and is very agreeably colored, having a chestnut back, reddish-pink breast and throat, and a yellowish-white bar on the wings. The food consists of seeds and of insects and their larvæ. The nest, which is generally placed in the fork of a tree, is an elegant structure usually covered with moss and lichens.

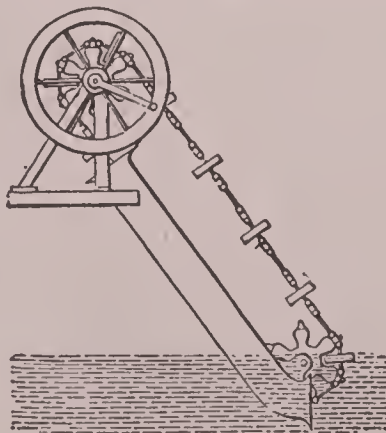
**CHAFIN**, Eugene' Wilder, born at East Troy, Wis., Nov. 1, 1852; educated in public school; graduated from law department of University of Wisconsin, 1875; practiced law in Waukesha, Wis., 1876-1900; grand chief templar of Good Templars of Wisconsin and Illinois; Prohibition candidate for various offices; nominated for president of the United States by Prohibitionist national convention at Columbus, O., in 1908.

**CHAILLE-LONG**, Charles, an American traveler, born in Maryland in 1840. He served on the Union side during the civil war and in 1875 was chief of staff to Gordon in the latter's expedition up the Nile. Returning to America he studied international law, and in 1887 was made consul general in Korea. He has published several works on the Orient.

**CHAIN**, in surveying, is a measure consisting of 100 links, each 7.92 inches in length, and having a total length of 4 rods, or 66 feet. It is sometimes called Gunter's chain, from its inventor.

**CHAIN-ARMOR**, coats and other pieces of mail, formed of hammered iron links, constituting a flexible garment which fitted to the person.

**CHAIN-PUMP**, a pump consisting in principle of an endless chain equipped



Chain-pump.

with a number of valves or buckets moving round two wheels, one above and one below. The chain in its ascent

passes through a tube closely fitting the valves or buckets, the water being discharged either from the top of the tube or from an orifice in it.

**CHAINS**, strong links or plates of iron, the lower ends of which are bolted to a ship's side, used to contain the blocks called dead-eyes, by which the shrouds of the masts are fastened.

**CHAIN-SHOT**, two cannon-balls connected by a chain, which, when discharged, revolve upon their shorter axis, and mow down masts, rigging, etc.

**CHALCED'ONY** (kal-sed'o-ni), a mineral, a variety of quartz, called also white agate, resembling milk diluted with water, semi-transparent or translucent, and more or less clouded with circles and spots. It is found usually in cavities of rocks uncrystallized, in veins, botryoidal masses, etc., and is used in jewelry. There are several varieties, such as the common chalcedony, chrysoprase, sard, and sardonyx.

**CHALDÆA**, in ancient geography, the southerly part of Babylonia, or in a wider sense corresponding to Babylonia itself. The name Chaldæans was especially applied latterly to a portion of the Babylonian Magi, who were devoted to the pursuit of astronomy and magical science. See Babylonia.

**CHAL'ICE**, a term generally applied to a communion cup for the wine in the Eucharist, often of artistic and highly ornamental character.

**CHALK** (chak), a well-known earthy limestone, of an opaque white color, soft and admitting no polish. It is an impure carbonate of lime, and is used as an absorbent and ant-acid, and for making marks for various purposes, as on the black-board in schools, and by artisans and others.—Black chalk is a soft variety of argillaceous slate. (See Black Chalk.)—Brown chalk, a familiar name for umber.—Red chalk, another name for ruddle.—French chalk, steatite or soap-stone, a soft magnesian mineral. Drawing chalks were originally restricted in colors to white, black, and red, but now chalks of every color are used, and are known by the name of crayons.—In geology chalk is the rock which forms the higher part of a series or group of strata, comprising rocks of different kinds, termed the cretaceous system.

**CHAL'LENGE**, to jurors, is an objection either to the whole panel or array, that is, the whole body of jurors returned, or to the polls, that is, to the jurors individually; and it is either peremptory, that is, without assigning any reason, or for cause assigned. See Jury.

**CHALMERS**, Thomas, D.D., an eminent Scottish divine, born in 1780, at Anstruther Easter, Fife. In 1803 he was presented to the parish of Kilmany, in Fife, where he made a high reputation as a preacher. In 1808 he published an Inquiry into the Extent and Stability of National Resources. In 1813 his article on Christianity appeared in the Edinburgh Encyclopædia, and shortly afterward his review of Cuvier's Theory of the Earth, in the Christian Instructor. His fame as a preacher had by this time extended itself throughout Scotland, and in 1815 he was inducted to the Tron



Church of Glasgow. His astronomical discourses delivered there in the following winter produced a sensation not only in the city but throughout the country. In 1832 he published his *Political Economy*, and shortly afterward his *Bridgewater Treatise On the Adaptation of External Nature to the Moral and Intellectual Constitution of Man*. During this period he was occupied with the subject of church



Thomas Chalmers, D.D.

extension on the voluntary principle, but it was in the great non-intrusion movement in the Scottish church that his name became most prominent. Throughout the whole contest to the Disruption in 1843, he acted as the leader of the party that then separated from the Establishment, and may be regarded as the founder of the Free Church of Scotland, of the first assembly of which he was moderator. His death took place suddenly, and apparently during sleep, in the night preceding May 31, 1847. He was a D.D. of Glasgow University and a D.C.L. of Oxford.

**CHAMBER**, a word used in many countries to designate a branch of government whose members assemble in a common apartment, as the chamber of deputies in France, or applied to bodies of various kinds meeting for various purposes. The imperial chamber (in German *Reichskammergericht*) of the old German Empire was a court established at Wetzlar, near the Rhine, by Maximilian I. in 1495, to adjust the disputes between the different independent members of the German Empire, and also such as arose between them and the emperor.—Chambers of commerce are associations of the mercantile men of towns for the purpose of protecting and furthering the interests of the commercial community.

**CHAMBERLAIN**, Joseph, English statesman, born in London in 1836, and educated at London University school. In 1876 he entered parliament as a representative of Birmingham, and at the general election of 1880 he was chosen for the same city along with Mr. Bright and Mr. Muntz. Under Mr. Gladstone's premiership he became president of the Board of Trade, and a cabinet-minister, and was able to pass the Bankruptcy Act now in force, though he failed with his merchant shipping bill. In the Gladstone government of 1886 he was president of the Local Government Board. As colonial secretary in the Unionist government in 1895–1903 he has been

prominent in other affairs besides the Boer War of 1899–1902.

**CHAMBER OF COMMERCE**, an organization of traders or merchants for the purpose of facilitating transactions of business, making a central market, etc. The term has been superseded in many American cities by the term Board of Trade. Chambers of Commerce use their influence for legislation favorable to trade, collect and publish trade statistics, and take part in public enterprises for the commercial good of the community. The New York Chamber of Commerce was organized in 1768, and many Chambers of Commerce in Europe antedate it by many years.

**CHAMBERS**, Robert, historical and miscellaneous writer, the younger of two brothers originally composing the publishing firm of W. & R. Chambers, was born at Peebles in 1802. Besides editing or compiling many instructive works of a high class, including the *Cyclopædia of English Literature*; the *Domestic Annals of Scotland*; *Ancient Sea-Margins*; and the *Book of Days*. He also edited a valuable edition of Burns. He died at St. Andrews in 1871. His name was long associated with the authorship of the famous "*Vestiges of Creation*," and it was not known to be really his till years after his death.—William Chambers wrote *Things as They Are in America*, *History of Peebles-shire*; *France, its History and Revolutions*; *Memoir of Robert Chambers*, with *Autobiographical Reminiscences*, etc. He was twice lord-provost of Edinburgh. He died in 1883, just as a baronetcy was to be conferred on him.

**CHAMBERS**, Robert William, an American writer and artist, born in New York in 1865. He has published several volumes of fiction and exhibited in the Paris salon of 1889.

**CHAMBERSBURG**, a town in Pennsylvania, in a fertile and populous district. Pop. 10,000.

**CHAMBERTIN** (shān-ber-tan), a superior kind of red Burgundy wine, named after the place where it is produced.

**CHAMBORD** (shān-bōr), Henri Charles Ferdinand Marie Dieudonné, Comte, Duke of Bordeaux, the last representative of the elder branch of the French Bourbon dynasty, called by his partisans Henry V. of France. He was born in 1820, seven months after the assassination of his father, Prince Charles Ferdinand d'Artois, duke de Berry. Charles X., after the revolutionary outbreak of 1830, abdicated in his favor; but the young count was compelled to leave the country with the royal title unrecognized by the nation. In 1846 he married the Princess Maria-Theresa, eldest daughter of the Duke of Modena; and in 1851 inherited the domain of Frohsdorf, near Vienna, where for the most part he subsequently resided. He died in 1883, leaving no heir.

**CHAME'LEON** (ka-mē'li-on), a genus of reptiles belonging to the Saurian or lizard order, a native of parts of Asia, Africa, and the south of Europe. The best-known species, has a naked body 6 or 7 inches long, with a prehensile tail of about 5 inches, and feet suitable for

grasping branches. The skin is cold to the touch, and contains small grains or eminences of a bluish-gray color in the shade, but in the light of the sun all parts of the body become of a grayish-brown or tawny color. It possesses the curious faculty, however, of changing its color, either in accordance with its environment, or with its temper when disturbed, the change being due to the presence of clear or pigment-bearing



Chameleon.

contractile cells placed at various depths in the skin, their contractions and dilations being under the influence of the nervous system. Their power of fasting and habit of inflating themselves gave rise to the fable that they lived on air, but they are in reality insectivorous, taking their prey by rapid movements of a long viscid tongue. In general habit they are dull and torpid.

**CHAMELEON MINERAL**, a name given to manganate of potassium, because a solution of it changes from green, through a succession of colors, to a rich purple.

**CHAMOIS** (sham'wā), a species of goat-like antelope inhabiting high inaccessible mountains in Europe and Western Asia. Its horns, which are about 6 or 7 inches long, are round, almost



Chamois.

smooth, perpendicular and straight until near the tip, where they suddenly terminate in a hook directed backward and downward. Its hair is brown in winter, brown fawn color in summer, and grayish in spring. The head is of a pale yellow color with a black band



from the nose to the ears and surrounding the eyes. The tail is black. Its agility, the nature of its haunts, and its powers of smell, render its pursuit an exceedingly difficult and hazardous occupation.

**CHAMOMILE** or **CAMOMILE** (kam'o-mil), a well-known European plant. It is perennial, and has slender, trailing, hairy, and branched stems. The flower is white, with a yellow center. Both leaves and flowers are bitter and aromatic. The fragrance is due to the presence of an essential oil, called oil of chamomile, of a light blue color when first extracted, and used in the preparation of certain medicines. Both the leaves and the flowers are employed in fomentations and poultices, and also in the form of an infusion as a stimulant or anti-spasmodic.

**CHAMPAGNE** (sham-pān'), a French wine, white or red, which is made chiefly in the department of Marne, in the former province Champagne, and is generally characterized by the property of creaming, frothing, or effervescing when poured from the bottle, though there are also still Champagne wines. The creaming or slightly sparkling Champagne wines are more highly valued by connoisseurs, and fetch greater prices than the full-frothing wines, in which the small quantity of alcohol they contain escapes from the froth as it rises to the surface, carrying with it the aroma and leaving the liquor nearly vapid. The property of creaming or frothing possessed by these wines is due to the fact that they are partly fermented in the bottle, carbonic acid being thereby produced. Wine of a similar kind can of course be made elsewhere, and some of the German champagnes are hardly to be distinguished from the French. Much artificial or imitation champagne is sold.

**CHAMPAIGN**, (shām-pān'), a city in Champaign County, Ill., 128 miles south by west of Chicago, on the Illinois Central, the Cleveland, Cincinnati, Chicago and Saint Louis, and a branch of the Wabash railroads. Pop., 13,160.

**CHAMP-DE-MARS** (shān-dé-mārs), that is Field of Mars, an extensive piece of ground in Paris, used as a place of military exercise. It was here that Louis XVI. swore to defend the new constitution in 1790, and it was the site of the exhibitions of 1867 and 1878.

**CHAMPLAIN** (sham-plān') Lake, a lake, chiefly in the United States, between the states of New York and Vermont, but having the north end of it in Canada; extreme length, north to south, about 120 miles; breadth, from half a mile to 15 miles; area, about 600 square miles. It is connected by canal with the Hudson River, and has for outlet the river Richelieu, or Sorel, flowing north to the St. Lawrence. Its scenery is beautiful, and attracts many visitors.

**CHAMPLAIN** (shān-plan), Samuel, a French naval officer and maritime explorer, born about 1570. His exploits in the maritime war against Spain in 1595 attracted the attention of Henry IV., who commissioned him in 1603 to found establishments in North America. After three voyages for that purpose, in the last of which he founded Quebec, he was

in 1620 appointed governor of Canada. He wrote an account of his voyages, and died in 1635.



Champlain.

**CHAMPOLLION** (shān-pol-yōn), Jean François, French scholar, celebrated for his discoveries in the department of Egyptian hieroglyphics, born at Figeac, department of Lot, in 1790. At an early age he devoted himself to the study of Hebrew, Arabic, Coptic, etc., and in 1809 became professor of history at Grenoble. He soon, however, retired to Paris, where, with the aid of the trilingual inscription of the Rosetta Stone and the suggestions thrown out by Dr. Thomas Young, he at length discovered the key to the graphic system of the Egyptians, the three elements of which—figurative, ideographic, and alphabetic—he expounded before the Institute in a series of memoirs in 1823. These were published in 1824 at the expense of the state. In 1826 Charles X. appointed him to superintend the department of Egyptian antiquities in the Louvre; in 1828 he went as director of a scientific expedition to Egypt; and in 1831 the chair of Egyptian archaeology was created for him in the Collège de France. He died at Paris in 1832.

**CHANCE**, in the ordinary acceptance of the term, an unexpected occurrence. Chance exists only in so far as the intention, desires, or knowledge of men are concerned. See Cause.

**CHAN'CELLOR**, a high official in many of the kingdoms of Europe, the office including in its duties the supervision of charters and other official writings of the crown requiring solemn authentication. The title and office are also ecclesiastical, and hence each bishop still has his chancellor, the principal judge of his consistory. In the new German empire, the chancellor (Reichskanzler) is president of the Federal Council, and has the general conduct of the imperial administration. In the United States, a chancellor is the judge of a court of chancery or equity established by statute.

**CHAN'CELLORSVILLE**, the site of one of the greatest battles of the American civil war, in which, on the 2d, 3d, and 4th of May, 1863, a nominal victory was gained by the Confederates under Generals Lee and Jackson over the Federal troops, commanded by General Hooker. The Federal troops, though compelled to retreat across the Rappahannock, carried with them some thousands of prisoners and one more gun

than they had lost, while the Confederates lost from 15,000 to 18,000 men and their brilliant leader Jackson.

**CHAN'CERY**, in England, the highest court, next to parliament, and presided over by the Lord High Chancellor. In the U. States, a court established in many states under this name and, in effect, a court of equity. In most states there are no separate courts of chancery or equity, the same judge presiding over the court of common law and the equity court also. The court of equity originated the injunction, and, in many ways, has larger power than a law court.

**CHANDA** (chān-dā'), a town of India, Central Provinces, surrounded by a wall 5½ miles long, with manufactures and a considerable trade. Pop. 16,137.—The District, has an area of 10,785 sq. miles, a pop. of 697,610.

**CHAN'DLER**, William Eaton, an American legislator, born in 1835 in New Hampshire. He occupied several positions in the departments of the national government from 1865 to 1881, and from the latter year to 1901 was U. States senator from New Hampshire.

**CHANDLER**, Zachariah, an American legislator born in New Hampshire in 1813, removed to Detroit in 1833, and one of the organizers of the republican party. In 1857 he was elected United States senator from Michigan and was twice re-elected. In 1875-7 he was secretary of the interior under Grant, and in 1879 was again elected to the senate. As chairman of the national republican committee he aroused much enmity by his forceful methods. He died suddenly in 1879.

**CHANG-CHOW-FOO**, a city, China, province of Fokien, 36 miles s.w. of Amoy, which is its port. It stands in a valley surrounded by hills and intersected by a river, and is the center of the silk manufacture of the province. Pop. estimated at from 800,000 to 1,000,000.

**CHANNEL**, English. See English Channel.

**CHANNEL ISLANDS**, a group of islands in the English Channel, off the w. coast of department La Manche, in France. They belong to Britain, and consist of Jersey, Guernsey, Alderney, and Sark, with some dependent islets. They form the only remains of the Norman provinces once subject to England. Area 112 sq. miles, pop. 95,841.

**CHANNEL TUNNEL**. See English Channel.

**CHANNING** (chan'ing), William Ellery, American preacher and writer, born at Newport, Rhode Island, in 1780. He studied at Harvard College, became a decided Unitarian, and propagated Unitarian tenets with great zeal and success. His first appointment as a pastor was in 1803, when he obtained the charge of a congregation in Boston, and ere long he became known as one of the most popular preachers of America. His reputation was still further increased by the publication of writings, chiefly sermons, reviews, etc., on popular subjects. He died at Burlington, Vermont, in 1842.—His nephew, William Henry Channing, born 1810, also a Unitarian preacher (for some time at Liverpool)



and supporter of the socialistic movement, wrote a memoir of his uncle and other works. He died in 1884.

**CHANT**, a short musical composition consisting generally of a long reciting note, on which an indefinite number of words may be intoned, and a melodic phrase or cadence. A single chant consists of two strains, the first of three and the second of four bars in length. A double chant has the length of two single ones.

**CHAOS** (kā'os), in old theories of the earth, the void out of which sprang all things or in which they existed in a confused, unformed shape before they were separated into kinds.

**CHAP-BOOKS**, a species of cheap literature which preceded the popular periodicals of the present day. They usually consisted of coarsely printed (and often coarsely written) publications sold for a copper or two, and were so called because they were prepared by the popular publishers expressly for sale by the chapmen or pedlars, who hawked them from district to district. They included lives of heroes and wonderful personages, tales of roguery and broad humor, witch and ghost stories etc.

**CHAP'EL**, a term applied to buildings of various kinds erected for some sort of religious service.

**CHAPELLE**, Placide Louis, an American Roman Catholic churchman, born in France in 1842, and studied in Maryland. In 1891 he was made coadjutor of Santa Fé, in 1897 archbishop of New Orleans, and in 1899 apostolic delegate to the Philippine Islands.

**CHAPLAIN** (chap'lin), literally a person who is appointed to a chapel, as a clergyman not having a parish or similar charge, but connected with a court, the household of a nobleman, an army, a prison, a ship, or the like.

**CHAPTER**, one of the chief divisions of a book. As the rules and statutes of ecclesiastical establishments were arranged in chapters, so also the assembly of the members of a religious order, and of canons, was called a chapter. The orders of knights used this expression for the meetings of their members, and some societies and corporations call their assemblies chapters.

**CHARADE** (sha-rād' or sha-rād'), a kind of riddle, the subject of which is a word that is proposed for discovery from an enigmatical description of its several syllables, taken separately as so many individual and significant words. When dramatic representation is used to indicate the meaning of the syllables and the whole word it is called an acting charade.

**CHAR'COAL**, a term applied to an impure variety of carbon, especially such as is produced by charring wood. One kind of it is also obtained from bones (see Bone Black); lampblack and coke are also varieties. Wood charcoal is prepared by piling billets of wood in a pyramidal form, with vacuities between them for the admission of air, and causing them to burn slowly under a covering of earth. In consequence of the heat, part of the combustible substance is consumed, part is volatilized, together with a portion of water, and

there remains behind the carbon of the wood, retaining the form of the ligneous tissue. Another process consists in heating the wood in close vessels, by which the volatile parts are driven off, and a charcoal remains in the retorts, not so dense as that obtained by the other process. Wood charcoal, well prepared, is of a deep-black color, brittle, and porous, tasteless and inodorous. It is infusible in any heat a furnace can raise; but by the intense heat of a powerful galvanic apparatus it is hardened, and at length is volatilized, presenting a surface with a distinct appearance of having undergone fusion. Charcoal is insoluble in water, and is not affected by it at low temperatures; hence, wooden stakes which are to be immersed in water are often charred to preserve them, and the ends of posts stuck in the ground are also thus treated. Owing to its peculiarly porous texture, charcoal possesses the property of absorbing a large quantity of air or other gases at common temperatures, and of yielding the greater part of them when heated. Charcoal likewise absorbs the odoriferous and coloring principles of most animals and vegetable substances, and hence is a valuable deodorizer and disinfectant. Water which, from having been long kept in wooden vessels, as during long voyages, has acquired an offensive smell, is deprived of it by filtration through charcoal powder. Charcoal can even remove or prevent the putrescence of animal matter. It is used as fuel in various arts, where a strong heat is required, without smoke, and in various metallurgic operations. By cementation with charcoal, iron is converted into steel. It is used in the manufacture of gunpowder. In its finer state of aggregation, under the form of ivoryblack, lampblack, etc., it is the basis of black paint; and mixed with fat oils and resinous matter, to give a due consistence, it forms the composition of printing-ink.

**CHARENTE** (shā-rānt), a river in Western France, rising in the department of Haute-Vienne, and falling into the sea about 8 miles below Rochefort, opposite to the isle of Oleron, after a course of about 200 miles. It gives its name to two departments.—Charente, an inland department; area, 2294 sq. miles; capital Angoulême. Soil generally thin, dry and arid; one-third devoted to tillage, a third to vineyards, and the remainder meadows, woods, and waste lands. The wines are of inferior quality, but they yield the best brandy in Europe, the celebrated cognac brandy being made in Cognac and other districts. Pop. 350,305.

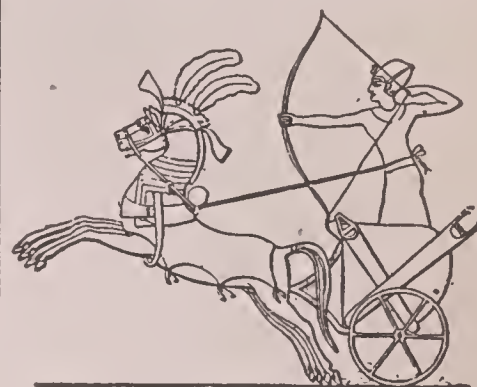
**CHARENTE-INFÉRIEURE** (an-fā-ri-eur), a maritime department; area, 2635 sq. miles. Surface in general flat; soil chalky and sandy, fertile, and well cultivated; a considerable portion planted with vines; salt marshes along the coast. The pastures are good, and well stocked with cattle, horses and sheep. Oysters and sardines abound on the coast. Salt and brandy are the only articles manufactured to any great extent. Capital La Rochelle. Pop. 452,149.

**CHARGE**, in heraldry, signifies the various figures depicted on the escutch-

eon.—In gunnery charge signifies the quantity of powder used at one discharge of a gun.—Charge, in military tactics, is the rapid advance of infantry or cavalry against the enemy, with the object of breaking his lines by the momentum of the attack. Infantry generally advance to about 100 yards and fire, then gradually quicken their pace into the charge-step, and dash at the enemy's lines. Cavalry charge in echelon or column against infantry, which is usually formed in squares to receive them.

**CHARGE-D'AFFAIRES** (shār-zhā-dāf-ār), the title of an inferior rank of diplomatic agents. See Minister, Foreign.

**CHARIOT**, a term applied to vehicles used both for pleasure and in war. Ancient chariots, such as those used among the Egyptians, Assyrians, Greeks and Romans, were of various forms.



Egyptian war-chariot.

A common form was open behind and closed in front, and had only two wheels. In ancient warfare chariots were of great importance; thus we read of the 900 iron chariots of Sisera, as giving him a great advantage against the Israelites. The Philistines in their war against Saul had 30,000 chariots. The sculptures of ancient Egypt show that the chariots formed the strength of the Egyptian army, these vehicles being two-horsed and carrying the driver and the warrior, sometimes a third man, the shield-bearer. There is no representation of Egyptian soldiers on horse-back, and consequently when Moses in his song of triumph over Pharaoh speaks of the "horse and his rider," "rider" must be understood to mean chariot-rider. In the Egyptian chariots the framework, wheels, pole, and yoke were of wood, and the fittings of the inside, the bindings of the framework, as well as the harness were chiefly of raw hide or of tanned leather. We have also numbers of sculptures which give a clear idea of the Assyrian chariots. These resembled the Egyptian in all essential features, containing almost invariably three men—the warrior, the shield-bearer, and the charioteer. A peculiarity of both is the quiver or quivers full of arrows attached to the side. The Assyrian war-chariot shown in the figure is drawn by three horses abreast, and all the appointments are rich and elaborate. It has, as will be noticed, two quivers crossing each other on the side, filled with arrows, and each also containing a small axe. A socket for holding the spear is also

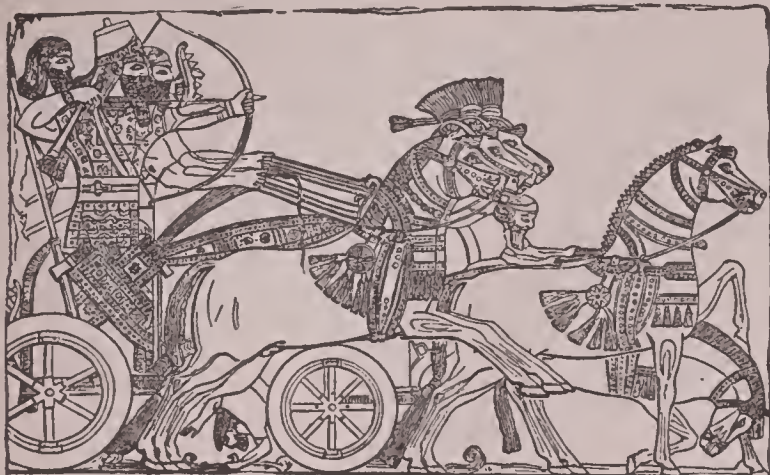


attached. From the front of the chariot a singular ornamental appendage stretches forward. War-chariots had sometimes scythe-like weapons attached to each extremity of the axle, as among the ancient Persians and Britons.

king, and divided the kingdom of the Franks with his younger brother Charleman, at whose death in 771, Charlemagne made himself master of the whole empire, which embraced, besides France, a large part of Germany. His first great

by intercourse with scholars; and, to the time of his death, this intercourse remained his favorite recreation. His mother-tongue was a form of German, but he spoke several languages readily, especially the Latin, and was naturally eloquent. He sought to improve the liturgy and church music, and attempted unsuccessfully to introduce uniformity of measures and weights. He built a lighthouse at Boulogne, constructed several ports, encouraged agriculture, and enacted wise laws. He convened councils and parliaments, published capitularies, wrote many letters (some of which are still extant), a grammar, and several Latin poems. His empire comprehended France, most of Catalonia, Navarre, and Aragon; the Netherlands, Germany as far as the Elbe, Saale, and Eider, Upper and Middle Italy, Istria, and a part of Sclavonia.

**CHARLES I.**, surnamed *le Chauve*, or the Bald, King of France, was son of Louis *le Débonnaire*, and was born 823. He died in 877. **CHARLES II.**, surnamed *le Gros*, or the Fat, King of France, is also known as Charles III., emperor of Germany, and was born about 832. He was the son of Louis the German, and ascended the French throne in 885 to the prejudice of his cousin, Charles the Simple, but was deposed in 887 and died the following year. **CHARLES III.**, King of France, surnamed the Simple, was the son of Louis the Stammerer, and born in 879, died in 929. **CHARLES IV.**, King of France, surnamed *le Bel*, or the Handsome, third son of Philippe *le Bel* was born in 1294, and ascended the throne in 1322. He died in 1328. **CHARLES V.**, surnamed the Wise, King of France, was the son of King John, and was born in 1337. He died in 1380. He erected the Bastille for the purpose of overawing the Parisians. **CHARLES VI.**, surnamed the Silly, King of France, and son of the foregoing, was born at Paris in 1368, and in 1388 took the reins of government into his own hands. Four years later he lost his reason, and one of the most disastrous periods of French history began. Charles died in 1422. **CHARLES VII.**, King of France, was born at Paris in 1403. He succeeded only to the southern provinces of the kingdom, Henry VI. of England being proclaimed king of France at Paris. The English dominion in France was under the government of the Duke of Bedford, and so skilfully did the English general conduct his operations that Charles had almost abandoned the struggle as hopeless, when the appearance of Jeanne d'Arc, the Maid of Orleans, gave, as if by a miracle, a favorable turn to his affairs, and the struggle ended in the expulsion of the English from all their possessions in France, except Calais. Charles died in 1461. **CHARLES VIII.**, King of France, son of Louis XI., was born in 1470, died in 1498. **CHARLES IX.**, King of France, son of Henry II., and Catharine de' Medici, born in 1550, ascended the throne at the age of ten years. His haughty and ambitious mother seized the control of the state. Along with the Guises she headed the Catholic League against the Calvinists, and her



Assyrian war-chariot.

Among the Greeks and Romans chariot-races were common. In Britain the name chariot was formerly given to a kind of light travelling carriage.

**CHARITIES**, institutions for the relief of the poor, sick, or otherwise disabled or incompetent members of society. Within the past 25 or 30 years organized charity has grown with tremendous strides until at present they represent vast sums of wealth and innumerable workers, paid and unpaid. These charities care for destitute adults, incurables of various kinds, criminals, the sick, children, homeless aged, indigent families, and many other types of pitiable persons. The majority of these institutions are independent of the state and are supported by private donations and bequests.

**CHARITIES**, United, societies for charitable purposes in various cities, consisting of a union of many or most of the charity organizations in the city. These united charity organizations have been established in 140 cities of the U. States and in 10 Canadian cities. The purpose is to secure co-ordination of work and to prevent imposition, or systematic deception or double dealing on the part of applicants.

**CHARITIES AND CORRECTION**, the national conference of, an organization with 1500 members scattered throughout the U. States, Canada, and Mexico. The first meeting was held in New York in 1874. In 1879 the conference met in Chicago, and yearly meetings are held in various cities. A fee of \$2.50 is charged for membership which entitles the member to the annual publications. The general secretary is J. P. Byers, Columbus, Ohio.

**CHARITY**, Sisters of. See Sisters of Charity.

**CHARLEMAGNE** (*shâr-lê-mân'*), King of the Franks, and subsequently Emperor of the West, was born in 742, probably at Aix-la-Chapelle. His father was Pepin the Short, king of the Franks, son of Charles Martel. On the decease of his father, in 768, he was crowned

enterprise was the conquest of the Saxons, a heathen nation living between the Weser and the Elbe, which he undertook in 772; but it was not till 803 that they were finally subdued, and brought to embrace Christianity. While he was combating the Saxons, Pope Adrian implored his assistance against Desiderius, king of the Lombards. Charlemagne immediately marched with his army to Italy, took Pavia, overthrew Desiderius, and was crowned King of Lombardy with the iron crown. In 778 he repaired to Spain to assist a Moorish prince, and while returning his troops were surprised in the valley of Roncesvalles by the Biscayans, and the rear-guard defeated; Roland, one of the most famous warriors of those times, fell in the battle. As his power increased, he meditated more seriously the accomplishment of the plan of his ancestor, Charles Martel, to restore the Western Empire. Having gone to Italy to assist the pope, on Christmas-day 800 he was crowned and proclaimed Cæsar and Augustus by Leo III. His son Pepin, who had been made king of Italy, died in 810, and his death was followed the next year by that of Charles his eldest son. Thus of his legitimate sons one only remained, Louis, king of Aquitania, whom Charlemagne adopted as his colleague in 813. He died Jan. 28, 814, in the forty-seventh year of his reign, and was buried at Aix-la-Chapelle, his favorite and usual place of residence. Charlemagne was a friend of learning, and deserves the name of restorer of the sciences and teacher of his people. He attracted by his liberality the most distinguished scholars to his court (among others, Alcuin, from England), and established an academy in his palace at Aix-la-Chapelle, the sittings of which he attended with all the scientific and literary men of his court. He invited teachers of language and mathematics from Italy to the principal cities of the empire, and founded schools of theology and the liberal sciences in the monasteries. He strove to cultivate his mind



## CHARLES IV.

tortuous and unscrupulous policy helped to embitter the religious strife of the factions. After a series of Huguenot persecutions and civil wars a peace was made in 1570, which, two years later, on 24th August, 1572, was treacherously broken by the Massacre of St. Bartholomew's. The king, who had been little more than the tool of his scheming mother, died two years afterward, in 1574. **CHARLES X.**, King of France, Comte d'Artois, born at Versailles in 1757, grandson of Louis XV., was the youngest son of the dauphin, and brother of Louis XVI. He died in 1836. His grandson, the Comte de Chambord (which see), claimed the French throne as his heir.

**CHARLES IV.**, Emperor of Germany, of the house of Luxemburg, was born 1316, and was the son of King John of Bohemia. In 1346 he was elected emperor by five of the electoral princes,



Charles V, of Germany.

while the actual emperor Louis the Bavarian was still alive. On the death of the latter a part of the electors elected Count Gunther of Schwarzburg, who soon after died; and Charles at length won over his enemies, and was elected and consecrated emperor at Aix-la-Chapelle. He died at Prague in 1378. **CHARLES V.**, Emperor of Germany and King of Spain (in the latter capacity he is called Charles I.), the eldest son of Philip, archduke of Austria, and of Joanna, the daughter of Ferdinand and Isabella of Spain, was born at Ghent, Feb. 24, 1500. Charles was thus the grandson of the Emperor Maximilian and Mary, daughter of Charles the Bold, last duke of Burgundy, and inherited from his grandparents on both sides the fairest countries in Europe, Aragon, Naples, Sicily, Sardinia, Castile, and the colonies in the New World, Austria, Burgundy, and the Netherlands. On the death of Ferdinand, his grandfather, Charles assumed the title of King of Spain. Foiled in his schemes and dejected with repeated failures, Charles resolved to resign the imperial dignity, and transfer his hereditary estates to his son Philip. In 1555 he conferred on him the sovereignty of the Netherlands, and on January 15, 1556, that of Spain, retiring himself to a residence beside the monastery of Yuste, in Estremadura, where he amused himself by mechanical labors and the cultivation of a garden. He still took a strong interest in public affairs, though latterly he was very much of an invalid,

his ill health being partly caused by his high living. He died on Sept. 21, 1558. **CHARLES VI.**, German emperor, the second son of the Emperor Leopold I., was born Oct. 1, 1685. He was destined according to the ordinary rules of inheritance to succeed his relative Charles II. on the throne of Spain. But Charles II. by his will made a French prince, Philip, duke of Anjou, grandson of Louis XIV., heir to the Spanish monarchy. This occasioned the war of the Spanish Succession, in which England and Holland took the part of the Austrian claimant. In 1733 a war with France and Spain regarding the succession in Poland terminated unfavorably for him, he having to surrender Sicily, Naples, and part of Milan, to Spain, and Lorraine to France. In 1737 he renewed the war with the Turks, this time unsuccessfully. Charles died Oct. 20, 1740. **CHARLES VII.**, Emperor of Germany, born in 1697, was the son of Maximilian Emanuel, elector of Bavaria. In 1726 he succeeded his father as Elector of Bavaria. In support of his claims he invaded Austria with an army, took Prague, was crowned king of Bohemia, and in 1742 was elected emperor. But fortune soon deserted him. The armies of Maria Theresa reconquered all Upper Austria, and overwhelmed Bavaria. Charles fled to Frankfurt, and returning to Munich in 1744, died there the following year.

**CHARLES I.**, King of England, Scotland, and Ireland, was born at Dunfermline, Scotland, in the year 1600, and was the third son of James VI. and Anne of Denmark. He married Henrietta Maria, daughter of Henry IV. of France, and in 1625 succeeded to the throne, receiving the kingdom embroiled in a Spanish war. The first parliament which he summoned, being



Charles I, of England.

more disposed to state grievances than grant supplies, was dissolved. Next year (1626) a new parliament was summoned; but the House proved no more tractable than before, and was soon dissolved. In 1628 the king was obliged to call a new parliament, which showed itself as much opposed to arbitrary measures as its predecessor, and after voting the supplies prepared the Petition of Right, which Charles was constrained to pass into a law. In was in Scotland, however, that formal warlike opposition was destined to commence. The king had on his side the great bulk of the gentry, while nearly all the Puritans and

## CHARLES XII.

the inhabitants of the great trading towns sided with the parliament. The first action, the battle of Edgehill (23d Oct., 1642), gave the king a slight advantage; but nothing very decisive happened till the battle of Marston Moor, in 1644, where Cromwell routed the royalists. Charles at length gave himself up to the Scottish army at Newark (5th May, 1646). All interposition being vain, he was beheaded before the Banqueting House, Whitehall, on 30th Jan., 1649, meeting his fate with great dignity and composure.

**CHARLES II.**, King of England, Ireland, and Scotland, son of Charles I. and Henrietta Maria of France, was born in 1630. He was a refugee at the Hague on the death of his father, on which he immediately assumed the royal title. Cromwell was then all-powerful in England; but Charles accepted an invitation from the Scots, who had proclaimed him their king July, 1650, and, passing over



Charles II.

to Scotland, was crowned at Scone (1651). Cromwell's approach made him take refuge among the English royalists, who, having gathered an army, encountered Cromwell at Worcester, and were totally defeated. With great difficulty Charles escaped to France. On the death of Cromwell the Restoration, effected without a struggle by General Monk, set Charles on the throne after the declaration of Breda, his entry into the capital (29th May, 1660) being made amidst universal acclamations. In 1662 he married the Infanta of Portugal, Catharine of Braganza, a prudent and virtuous princess, but in no way calculated to acquire the affection of a man like Charles. For a time his measures, mainly counselled by the chancellor Lord Clarendon, were prudent and conciliatory. But the indolence, extravagance, and licentious habits of the king soon involved the nation as well as himself in difficulties. He died from the consequences of an apoplectic fit in February, 1685, after having received the sacrament according to the rites of the Roman Church.

**CHARLES XII.**, King of Sweden, was born at Stockholm, June 27, 1682. On the death of his father, in 1697, when he was but fifteen years old, he was declared of age by the estates. Unfortunate in his campaigns against the Russians he returned to his own country and set about the measures necessary to defend the kingdom, and the fortunes of Sweden were beginning to assume a favorable aspect when he was



slain by a cannon-ball as he was besieging Frederikshall, Nov. 30, 1718. Firmness, valor, and love of justice were the great features in the character of Charles, but were disfigured by an obstinate rashness. After his death Sweden sank from the rank of a leading power. **CHARLES XIII.**, King of Sweden, was born in 1748, being the second son of King Adolphus Frederick. In the war with Russia, in 1788, he received the command of the fleet, and defeated the Russians in the Gulf of Finland. He adopted as his successor Marshal Bernadotte, who became king on the death of Charles, Feb. 5, 1818.

**CHARLES XIV.** See Bernadotte.

**CHARLES I.**, King of Spain. See Charles V., Emperor of Germany.

**CHARLES IV.**, King of Spain, born at Naples 12th Nov. 1748, succeeded his brother Ferdinand VI. in 1788, was all his life completely under the influence of his wife and her paramour Godoy. In 1808 Charles abdicated in favor of Napoleon. He died in 1819.

**CHARLES**, Archduke of Austria, third son of the Emperor Leopold II., was born in Florence 5th Sept. 1771. After distinguishing himself in various campaigns, in 1796 he was appointed commander-in-chief of the Austrian army on the Rhine, and won several victories against the French. In 1805 he commanded in Italy against Masséna, and won Caldiero (31st Oct.); but in the campaign of 1809 in Germany against Napoleon he was unsuccessful, the battle of Wagram (5th and 6th July) laying Austria at the feet of the French emperor. With that event the military career of Charles closed. He died in 1847. He published several military works of value.

**CHARLES ALBERT**, King of Sardinia, born 1798, was the son of Charles Emmanuel, prince of Savoy-Carignan. He abdicated in favor of his son, Victor Emmanuel, and, retiring to Portugal, died 28th July, 1849.

**CHARLES EDWARD STUART**, called the Pretender, grandson of James II. king of England, son of James Edward and Clementina, daughter of Prince Sobieski, was born in 1720 at Rome.



Prince Charles Edward Stuart.

In 1742 he went to Paris and persuaded Louis XV. to assist him in an attempt to recover the throne of his ancestors. Fifteen thousand men were on the point of sailing from Dunkirk, when the English admiral Norris dispersed the whole fleet. Charles now determined to trust to his own exertions. Accompanied by

seven officers he landed on the west coast of Scotland, from a small ship called the *Doutelle*. Many Lowland nobles and Highland chiefs went over to his party. With a small army thus formed he marched forward, captured Perth, then Edinburgh (Sept. 17, 1745), defeated an army of 4000 British under Sir John Cope at Prestonpans (Sept. 22), and advancing obtained possession of Carlisle. He now caused his father to be proclaimed king, and himself regent of England; removed his head-quarters to Manchester, and soon found himself within 100 miles of London, where many of his friends awaited his arrival. The rapid successes of the adventurer now caused a part of the British forces in Germany to be recalled. Want of support, disunion, and jealousy among the adherents of the house of Stuart, some errors, and the superior force opposed to him, compelled Prince Charles to retire in the beginning of 1746. He latterly fell into habits of intoxication, and he died Jan. 31, 1788.

**CHARLES MARTEL**, ruler of the Franks, was a son of Pepin Héristal. His father had governed as mayor of the palace under the weak Frankish kings with so much justice that he was enabled to make his office hereditary in his family. Chilperic II., king of the Franks, refusing to acknowledge Charles Martel as mayor of the palace, the latter deposed him, and set Clothaire IV. in his place. After the death of Clothaire he restored Chilperic, and subsequently placed Thierri on the throne. Charles Martel rendered his rule famous by the great victory which he gained in October, 732, over the Saracens, near Tours, from which he acquired the name of Martel, signifying hammer. He died 741. Charlemagne was his grandson. See Charlemagne.

**CHARLES THE BOLD**, Duke of Burgundy, son of Philip the Good and Isabella of Portugal, born at Dijon Nov. 10, 1433. While his father yet lived Charles left Burgundy, and forming an alliance with some of the great French nobles for the purpose of preserving the power of the feudal nobility, he marched on Paris with 20,000 men, defeated Louis XI. at Montlheri, and won the counties of Boulogne, Guines, and Ponthieu. Succeeding his father in 1467 he commenced his reign by severe repression of the citizens of Liège and Ghent. Charles now turned his arms against the Swiss, took the city of Granson, putting 800 men to the sword. But this cruelty was speedily avenged by the descent of a Swiss army, which at the first shock routed the duke's forces at Granson, March 3, 1476. Mad with rage and shame Charles gathered another army, invaded Switzerland, and was again defeated with great loss at Morat. The Swiss, led by the Duke of Lorraine, now undertook the reconquest of Lorraine, and obtained possession of Nancy. Charles marched to recover it, but was utterly routed and himself slain.

**CHARLESTON**, a city and seaport of South Carolina, on a tongue of land formed by the confluence of the rivers Cooper and Ashley, which unite just below the city, and form a spacious and convenient harbor extending about 7

miles to the Atlantic, and defended by several forts. The city is regularly laid out, most of the principal thoroughfares being 60 to 70 feet wide and bordered with fine shade-trees. It is much the



largest town in the state, and is one of the leading commercial cities in the south. The staple exports are cotton (to the value of, say, \$20,000,000 annually), cotton-seed, rice, rosin and turpentine, lumber, and phosphate. The civil war greatly damaged the trade, but there has since been marked commercial and industrial progress. Yellow fever has made frequent ravages in Charleston, but on the whole it is considered more healthy than most other Atlantic towns in the southern states. It was the scene of the outbreak of the civil war on April 12, 1861, and was evacuated by the Confederates on February 17, 1865. On 31st August, 1886, the coast region of the U. States from Alabama to New York experienced a series of earthquake shocks, from which Charleston in particular suffered severely, many lives and about five million dollars worth of property being destroyed. Pop. 64,000.

**CHARLESTON**, the county seat of Kanawha county, and capital of West Virginia, is situated on the Kanawha river at the confluence of Elk river 65 miles from its mouth and 150 miles s.s.w. of Wheeling. Pop. 13,109.

**CHARLOTTE**, a city and county-seat of Mecklenburg County, N. C., 125 miles west by south of Raleigh, on Sugar Creek, and on the Southern and the Seaboard Air-line railroads. It is in the gold region of the State, and a branch mint was established here in 1838. Pop. 21,040.

**CHARLOTTENBURG** (shâr-lot'en-burk), a town of Prussia, on the Spree, about 3 miles from Berlin, with a royal palace and park, great technical school or college, also a number of industrial and manufacturing establishments. Pop. 189,290.

**CHARLOTTE-RUSSE** (shâr-lot-rûs), a dish made of whipped-cream surrounded with a border of sponge-cake.

**CHARM**, anything believed to possess some occult or supernatural power, such as an amulet, spell, etc., but properly



applied (as the name, derived from Lat. *carmen*, a song, indicates) to spells couched in formulas of words or verses.

**CHARNEL-HOUSE**, a chamber or building under or near churches where the bones of the dead are deposited.

**CHARON** (kā'ron), in Greek mythology, the son of Erebus and Night. It was his office to ferry the dead in his crazy boat over the rivers of the infernal regions, for which office he received an obolus, or farthing, which accordingly was usually put into the mouth of the deceased. He was represented as an old man, with a gloomy aspect, matted beard, and tattered garments.

**CHART**, a hydrographical or marine map, that is a draft or projection of some part of the earth's surface, with the coasts, islands, rocks, banks, channels, or entrances into harbors, rivers, and bays, the points of compass, soundings, or depth of water, etc., to regulate the courses of ships in their voyages. The term chart is applied to a marine map; map is applied to a draft of some portion of land (often including sea also). A plane chart is one in which the meridians are supposed parallel to each other, the parallels of latitude at equal distances, and of course the degrees of latitude and longitude everywhere equal to each other. A great number of excellent charts are produced by the hydrographic department of the British admiralty. The United States Coast Survey Department produces similar charts.

**CHARTER**, a franchise or power, given to a corporation by a state enabling the corporation to perform the functions described in the charter. Charters were granted by the English kings to all sorts of associations in the American colonies. In the United States today corporations of all kinds are chartered by legislatures, inclusive of the cities incorporated within the state. Thus all public or civic corporations, of whatever kind, being creatures of the state, can be nullified or destroyed by the state at the will of the legislature. But the state cannot nullify the charter of a private corporation as this is forbidden by the federal constitution which provides that no state can pass a law impairing the obligation of contracts—unless this power is reserved by the state when it grants the charter.

**CHARTER-HOUSE**, a celebrated school and charitable foundation in the city of London. In 1371 Sir Walter Manny built and endowed it as a priory for Carthusian monks (hence the name, a corruption of Chartreuse, the celebrated Carthusian convent). After the dissolution of the monasteries it passed through several hands till it came into the possession of Thomas Sutton, who converted it into a hospital and school, richly endowed, consisting of a master, preacher, head schoolmaster, forty-four boys and eighty decayed gentlemen, with a physician and other officers and servants. Among famous men who have received their education at the Charter-house are Isaac Barrow, Addison, Steele, John Wesley, Blackstone, Grote, Thirlwall, Havelock, John Leech, and Thackeray.

**CHARTER OAK**, a great oak tree in Hartford, Conn., which was blown down in 1856, and which was believed to have been standing for 1000 years previously. It received its name from the tradition that the charter of Connecticut had been concealed in its hollow.

**CHARTREUSE** (shär-treuz) or **GREAT CHARTREUSE**, a famous Carthusian monastery in Southeastern France, a little northeast of Grenoble, situated at the foot of high mountains, 3280 feet above sea-level, the head-quarters of the order of the Carthusians. It was founded in 1084, but the present building, a huge, plain-looking pile, dates from 1676. The monks of this monastery manufacture the well-known liquor called Chartreuse, which owes its special properties to the aromatic plants growing on the Alps.

**CHARYBDIS** (ka-rib'dis), an eddy or whirlpool in the Straits of Messina, celebrated in ancient times, and regarded as the more dangerous to navigators because in endeavoring to escape it they ran the risk of being wrecked upon Scylla, a rock opposite to it. There are several whirlpools in this region which may have been dangerous enough to the undecked boats of the Greeks, but none, which the modern navigator with due caution may not easily pass.

**CHASE**: (1) in printing, an iron frame used to confine types when set in columns or pages. (2) The part of a gun between the trunnions and the swell of the muzzle, or in modern guns, in which the muzzle has no swell, the whole of that part of a gun which is in front of the trunnions.

**CHASE**, Salmon Portland, American statesman and jurist, born in New Hampshire, 1808. Having adopted the law as his profession he settled at Cincinnati and acquired a practice there. He early showed himself an opponent of slavery, and was the means of founding the Free-soil party, which in time gave rise to the great Republican party—the power that brought the downfall of slavery. In 1849–55 he was a member of the United States Senate, in which he vigorously opposed the extension of slavery into the new territories. In 1855 he was elected governor of Ohio, being re-elected in 1857. In 1860 he was an unsuccessful candidate for the presidency. In 1861 he was nominated secretary of the treasury, and in this post was signally successful in providing funds for carrying on the civil war. In 1864 he resigned office, and was appointed chief-justice of the supreme courts. He died in 1883.

**CHASING** is the art of working decorative forms in low-relief in gold, silver, or other metals. It is generally practised in connection with repoussé work, in which the figures are punched out from behind and are then sculptured on the front or chased with the graver.

**CHASSE POT RIFLE** (shäs-pō), a breech-loading rifle, named after its inventor, and adopted as the firearm of the French infantry in 1866, but since given up. It was about 4 lbs. lighter than the needle-gun and about 1 lb. lighter than the Martini-Henry rifle.

**CHASSEURS** (shäs-eur), a name given to various sections of light infantry and cavalry in the French service.

**CHAS'UBLE**, the upper garment worn by a priest during the celebration of mass. It was originally circular, had a hole in the middle for the head, but no holes for the arms. In later times the sides were cut away to give a freer



A, Ancient form of chasuble: 1, Apparel of the neck. 2222, Chasuble. 33, Orphreys of the chasuble. 4, The stole. 55, The alb. 6, Apparel of the alb. 7, The maniple.  
B, Modern form of chasuble.

motion to the arms, and it has now become an oblong garment hanging down before and behind, made of rich materials, as silk, velvet, cloth of gold, and has a cross embroidered on the back.

**CHAT**, the popular name of birds of the family Sylviadæ or warblers. They are small, lively birds, moving incessantly and rapidly about in pursuit of the insects on which they chiefly live. There are three species found in Britain, the stone-chat, whin-chat, and wheatear. The yellow-breasted chat of the United States is a larger bird, belonging to the family Turdidæ or thrushes.

**CHATEAU** (shā-tō), the French term for a castle or mansion in the country; a country-seat.—Château en Espagne, literally, a castle in Spain; a castle in the air: a phrase of doubtful origin.

**CHATEAUBRIAND** (shā-tō-bri-ān), François Auguste, Vicomte de, a celebrated French author and politician, was born at St. Malo in Brittany, of a noble family, September 14, 1768. After serving in the navy and the army he travelled in North America; but the news of the flight of Louis XVI. and his arrest at Varennes brought him back to France. Shortly after he quitted France and joined with other emigrants the Prussian army on the Rhine. In 1800 he returned to France, and in the following year published his romance of Atala, the scene of which is laid in America, and the year after his celebrated work, Le Génie du Christianisme, which is a kind of brilliant picture of Christianity in an æsthetic and romantic aspect. Style, power of description, and eloquence are the merits of the book rather than any depth of thought; but it carried the author's reputation far and wide, and contributed much to the religious reaction of the time. In his later years he wrote several works, but none of the value of his earlier productions. He died 4th July, 1848.

**CHATHAM**, William Pitt, Earl of, one of the most illustrious statesmen of



Britain, the son of Robert Pitt of Boconnoc, in Cornwall, born Nov. 15, 1708, and educated at Eton and Oxford. He entered parliament and soon attracted notice as a powerful opponent of Walpole. In spite of the king's dislike Pitt was powerful enough to win a



William Pitt, Earl of Chatham.

place in the administration (1746), first as vice-treasurer of Ireland, and afterward as paymaster-general. In 1756 he became secretary of state and real head of the government. Dismissed in 1757 on account of his opposition to the king's Hanoverian policy, no stable administration could be formed without him, and he returned to power the same year in conjunction with the Duke of Newcastle. In was under this administration and entirely under the inspiration of Pitt that Britain rose to a place among the nations she had not before occupied. Wolfe and Clive, both stimulated and supported in their great designs by Pitt, won Canada and India from the French, and the support the Great Commoner gave Frederick of Prussia contributed not a little to the destruction of French predominance in Europe. The accession of George III. brought Lord Bute into power, and Pitt, disagreeing with Bute, resigned in 1761. In 1766 he strongly advocated conciliatory measures toward the American colonies, and undertook the same year to form an administration, he going to the House of Lords as Earl of Chatham. But the ministry was not a success, and in 1768 he resigned. After this his principal work was his appeals for a conciliatory policy toward the colonies. But his advice was disregarded, and the colonies declared themselves independent in 1776. Chatham died May 11, 1778. He received a public funeral and a magnificent monument in Westminster Abbey. The character of Chatham was marked by integrity, disinterestedness, and patriotism. With great oratorical gifts and the insight of a great statesman he had liberal and elevated sentiments; but he was haughty and showed too marked a consciousness of his own superiority.

**CHAT'TANOO'GA**, a city and county-seat of Hamilton Co., Tenn., 150 miles southeast of Nashville, on the Tennessee River. The river is navigable eight months of the year as far as this place, and several lines of railroad pass through the city, making it an important railroad center. The Chickamauga National Military Park, laid out by the Federal Government on the site of the

battle of Chickamauga, is south by east of the city, and was dedicated in 1895. Another feature of interest is the National Cemetery, one of the largest in the country, containing 13,322 graves. Pop. 84,000.

**CHAT'TELS**, property movable and immovable, not being freehold. The word chattel is originally the same word with cattle, formed from late Latin capitalia, meaning heads of cattle, from L. caput, head. Chattels are divided into real and personal. Chattels real are such as belong not to the person immediately, but dependently upon something, as an interest in a land or tenement, or a lease, or an interest in advowsons. Any interest in land or tenements, for example, is a real chattel; so also is a lease, an interest in advowsons, etc. Chattels personal are goods which belong immediately to the person of the owner, and include all movable property.

**CHATTERERS**, the popular name of certain insectorial birds of the family Ampelide, as the Bohemian chatterer or waxwing and the chatterer of Carolina.

**CHAT'TERTON**, Thomas, a youth whose genius and melancholy fate have gained him much celebrity, was born at Bristol in 1752, of poor parents, and educated at a charity school. The most remarkable of his poems are those published under the name of Rowley, spurious antiques, such as *The Tragedy of Ælla*, *The Battle of Hastings*, *The Bristow Tragedy*, etc. He committed suicide in 1776.

**CHAU'CER**, Geoffrey, "the father of English poetry," born in London probably about 1340; died there on the 25th of October, 1400. Nothing is known of his education, but in 1356-59 he was a



Geoffrey Chaucer.

page to Princess Lionel. In 1367 we find his name as a valet of the king's chamber. Between 1370 and 1380 he was employed abroad in seven diplomatic missions. In one of these, in 1372, he was sent to Genoa as a commissioner to negotiate a commercial treaty. In 1374 he was appointed comptroller of the customs on wool at London. In 1377 he was sent to Flanders and France on diplomatic business and next year to Lombardy. In 1382 he was appointed comptroller of the petty customs. In 1386 he was returned to parliament as knight of the shire for Kent, but in the same year he shared the disgrace of his patron, John of

Gaunt, was dismissed from his comptrollerships, and reduced to a state of comparative poverty. His most celebrated work, *The Canterbury Tales*, was written at different periods between 1373 and 1400. It consists of a series of tales in verse (two in prose), supposed to be told by a company of pilgrims to the shrine of St. Thomas (Becket) at Canterbury in 1386. In its pages we get such pictures of English life and English ways of thought in the 14th century as are found nowhere else. Besides his great work Chaucer wrote many poems, some of which are founded on French or Italian works. He was buried in Westminster Abbey.

**CHAUFFEUR** (shâ'fêr) a French word, meaning stoker, applied generally to the operator of an automobile. It also is used to designate certain ruffians who during the French Revolution terrorized the country districts by garrotting helpless persons.

**CHAUTAU'QUA**, a beautiful lake in New York, 18 miles long and 1 to 3 broad, 726 feet above Lake Erie, from which it is 8 miles distant. On its banks is the village of Chautauqua, the center of a religious and educational movement of some interest. This originated in 1874, when the village was selected as a summer place of meeting for all interested in Sunday-schools and missions. Since then the Chautauqua Literary and Scientific Circle has taken origin here, the most prominent feature of which is to engage the members—wherever they may reside—in a regular and systematic course of reading, extending, when completed, over four years and entitling the student to a diploma. There are many local branches or societies, and it is attempted to start the movement in Britain.

**CHAUVINISM** (shô'vin-izm), an unreflecting and fanatical devotion to any cause, especially an exaggerated patriotism, so called from Nicholas Chauvin, a soldier so enthusiastically devoted to Napoleon I. and so demonstrative in his adoration that his comrades turned him into ridicule.

**CHECK**. See Cheque.

**CHECKERS**, the common name for the game of draughts.

**CHED'DAR**, a parish and thriving village, England, county Somerset, 18 miles s.w. Bristol. The dairies in the neighborhood have long been famous for the excellence of their cheese, which is made from the whole milk, on a highly approved method now widely practised.

**CHEESE**, one of the most important products of the dairy, is composed principally of casein, which exists in cows' milk to the extent of about 3 or 4 per cent, fat, and water. It is made from milk, skimmed wholly, partially, or not at all, the milk being curdled or coagulated, and the watery portion or whey separated from the insoluble curd, which being then worked into a uniform mass, salted (as a rule), and pressed in a vat or mold forms cheese, but requires to be cured or ripened for a time before being used. The coagulation of the milk may be effected either by adding an acid as in Holland, or sour milk as in Switzerland, or rennet as usual in Britain and this country. There are a great many



varieties of cheese, of which the most notable are Stilton, Cheshire, Cheddar, Dunlop, among British; and Parmesan, Gruyère, Gorgonzola, Gouda, among foreign ones. In the United States immense quantities of cheese are made, almost all the different European kinds being imitated. Large factories are devoted to the manufacture. Other kinds are known as sour-milk, skimmed-milk, cream, sweet-milk, etc., cheese. Sheep's and goat's milk cheese are also made. The output of cheese in the United States is upward of 300,000,000 pounds annually. New York and Wisconsin are the two most productive states, and production has been materially assisted by the experiments of the United States agricultural department with various ferments which hasten the process.

**CHEIROMANCY** (kī'ro-), or **PALMISTRY**, the art of divining by inspection of the lines of the hand; it was practised in India in the remotest ages; in Europe, during the middle ages, it was in great repute, but latterly it took refuge among the gypsies, who to this day find profit in the exercise of their favorite art.

**CHEIROPTERA** (kī-rop'te-ra), or **BATS**, an order of mammals, the essential character of which is the possession of a patagium, or expansion of the integument of the body which connects the tail throughout its whole length to the hinder limbs as far as the ankle, and thence passes along the side of the body to the fore-limbs, which are greatly elongated, and give support and varied movement to the expansion (which is popularly called the wing) by means of the very long and slender digits. Other mammals, as some of the squirrels and the flying lemur, have the power of gliding through the air for some distance, but none of them have the power of sustained flight, nor are the anterior extremities modified in the same way as are those of the bats. The Cheiroptera are divided into two sub-orders, Fruit-eaters, and Insect-eaters. (See Bat.)

**CHE-KIANG**, a maritime province, China, between lat. 27° and 31° n., and including the Chusan Archipelago; area, 39,150 sq. miles; pop. 11,588,692. It is traversed by the Grand Canal, and has as its principal ports Ningpo and Hangchow, the capital. Staple exports, silk and tea.

**CHELONIAN** (kē-lō'-), or **CHELONIA**, an order of reptiles including the tortoises and turtles, and distinguished by the body being inclosed in a double shell, out of which the head, tail, and four legs protrude. See Tortoise, Turtle.

**CHELSEA** (chel'sē), a suburb of London, and a mun. and parl. borough, on the Thames, opposite Battersea, and chiefly distinguished for containing a royal military hospital, originally commenced by James I. as a theological college, but converted by Charles II. for the reception of sick, maimed, and superannuated soldiers. The building was finished in 1692 by Sir Christopher Wren. Connected with the hospital is a royal military asylum, founded in 1801, for the education and maintenance of

soldiers' children. The parliamentary borough returns one member. Pop. parl. bor. 93,841.

**CHELSEA**, a city in Suffolk Co., Mass., and a suburb of Boston, from which it is distant 2 miles, on the Boston and Maine Railroad. It is connected with Charlestown by a bridge across the Mystic River, and with Boston by ferry and steam and electric railroads. Pop. 40,000.

**CHELTENHAM** (chel'tn-am), a municipal and parliamentary borough and fashionable watering-place in England, in the county of Gloucester, beautifully situated on the small river Chelt, within the shelter of the Cotswold Hills. It grew rapidly into a place of fashionable resort after the discovery of its saline, sulphuric, and chalybeate springs in 1716, to which, in 1788, George III. paid a visit. Pop. 49,439.

**CHEMICAL RAYS**, a not very appropriate name given to the blue and violet rays of the spectrum, and also the non-luminous rays at the violet end of the spectrum, which have a peculiarly powerful chemical effect on silver compounds.

**CHEMISTRY**, the science which treats of the nature, laws of combination, and mutual actions of the minute particles of the different sorts of matter composing our universe, and the properties of the compounds they form. As a science it is entirely of modern origin, in its earliest phases being identical with alchemy (which see), the great object of which was the discovery of the philosopher's stone. In this pursuit most minerals, especially such as presented the characters of metallic ores, were subjected to numerous experiments, and many important isolated discoveries were made by Basil Valentine, Raymond Lully, Paracelsus, Van Helmont, and others. But during the latter part of the 17th century the belief in alchemy was greatly on the wane, and just at its close the German chemist Becher threw out certain speculations regarding the cause of combustion, which were afterward taken up and extended by Stahl in the "phlogistic theory," and constitute the first generalization of the phenomena of chemistry, though the theory itself was diametrically opposed to the truth. About the middle of the 18th century Dr. Black made his great discovery of a gas differing from atmospheric air, rapidly followed by that of a number of other gases by Cavendish, Rutherford, Priestley, Scheele, etc.; and the discovery of oxygen by the two last-named chemists afforded to Lavoisier the means of revolutionizing and systematizing the science. By a series of experiments he showed that all substances, when burned, absorb oxygen, and that the weight of the products of combustion is exactly equal to that of the combustible consumed and of the oxygen which has disappeared. The application of this theory to the great majority of the most important chemical phenomena was obvious, and the Stahl hypothesis disappeared from the science. A yet more important step was the discovery by Dalton of the laws of chemical combination. His theory was immediately taken up by Berzelius,

to whose influence and careful determination of the chemical equivalents of almost all the elements then known, its rapid adoption was mainly due. To Berzelius we owe almost all the modern improvements in the methods of analysis, and to Sir H. Davy the foundation of electro-chemistry. Of late years every branch of the science has advanced, but the most extraordinary progress has been made in organic chemistry. The investigations of chemists have shown that the great majority of the different substances found at the surface of the earth can be broken up into several substances of less complicated nature, which resist all further attempts to decompose them, and appear to consist of only one kind of matter. These substances, by union of which all the different sorts of known matter are built up, are about seventy in number, and are called the chemical elements. When any two or more of these elements are brought in contact, under the proper conditions, they may unite and form chemical compounds of greater or less complexity, in which the constituents are held in union by a form of energy which has received the name of chemical affinity. This affinity is characterized by its acting between dissimilar particles, and producing a new kind of matter, readily distinguishable from either of the substances combining to form it, and which cannot be again separated into its elements by merely mechanical processes.

The properties of chemical compounds may be classified not merely under the head of the particular elements they contain, but also according to their special chemical functions. The advantages of the latter method were early recognized, and the distinction between acids and alkalies dates back to a period long previous to the ascertainment of their true nature. These, and the class of salts which are produced by the mutual action of an acid and a base, are the most important classes of chemical compounds. An acid is now described as a compound containing a certain quantity of hydrogen, easily replaceable by a metal when it comes in contact with it either in the free state or as an oxide.

Bases are compounds which, by reacting on acids, yield salts. The most important bases are oxides of metals, and they are divided into several sections, of which the most important are the alkalies. These substances are the hydrates of the so-called alkaline metals, and may be compared to water in which an atom of hydrogen is replaced by an atom of metal. Most of the bases, excepting the alkalies, are insoluble in water, and without any effect on vegetable colors. Another class of bases of great importance is typified by ammonia.

Sulphides are compounds of the metals with sulphur, and form a very important class of compounds. They are obtained either by heating the metals with sulphur in proper proportions, or by passing a current of hydrosulphuric acid gas through a solution of a salt. They exist abundantly in the mineral kingdom, and form some of the most important ores. Some of the sul-



phides are capable of acting as bases and others as acids, and by combination a class of salts, usually distinguished as sulphur salts, can be obtained. The greater part of the sulphides are insoluble in water, and some of them possess extremely fine colors, and are used as paints.

Organic chemistry is that branch of the science which treats of the compounds existing in plants and animals, or which may be produced from substances found ready formed in their tissues. It was at first believed that these compounds were peculiar in their constitution, quite distinct in their chemical relations, and produced by what was called vital affinity. The discovery by Wöhler, however, that urea could be produced artificially from purely mineral substances entirely altered this view; and since then the artificial production of many organic compounds has practically annulled the distinction between organic and inorganic chemistry except as a matter of convenience. Organic chemistry is now most commonly defined as the chemistry of the carbon compounds, for that element is found in every substance which can be extracted from plants and animals, in combination with hydrogen, oxygen, nitrogen, and less frequently with sulphur and phosphorus. These elements are so combined as in many cases to form compounds of extreme complexity, the constitution of some of which is still a matter of much difference of opinion among chemists; but the constitution of the simpler organic compounds is now thoroughly understood.

**CHEMISTS and DRUGGISTS**, in the United States, retail venders of drugs and various chemical reagents. They are regulated by law and prohibited from indiscriminately selling certain poisons and other drugs that are deemed dangerous or may be used for criminal purposes.

**CHEMNITZ** (kem'nits), the principal manufacturing town in the kingdom of Saxony, on the Chemnitz, 39 miles southwest of Dresden. The principal manufactures are white and printed calicoes, gingham, handkerchiefs, woolen and half-woolen goods, etc. There are also extensive cotton-spinning mills, and mills for the spinning of combed wool and floss-silk; dye-works, print-works, bleach-works, chemical works; large manufactures of cotton hose, etc. Pop. 206,584.

**CHEMULPO** (chē-mul'po), one of the new treaty-ports of Korea, exporting beans, ginseng, etc., and importing European and American manufactures.

**CHENEY**, Charles Edward, an American bishop of the Reformed Episcopal Church, born in New York in 1836. He was ordained in the Protestant Episcopal church and in 1873 he joined the reformed church in Chicago.

**CHENG**, a Chinese musical instrument, consisting of a series of tubes having free reeds. Its introduction into Europe led to the invention of the accordion, harmonium, and other free-reed instruments.

**CHENILLE** (she-nil'), a sort of ornamental fabric of cord-like form, made by weaving or twisting together warp-

threads, with a transverse filling or weft, the loose ends of which project all round in the form of a pile. Chenille carpets have a weft of chenille, the loose threads of which produce a fine velvety pile.

**CHEOPS** (kē'ops), the name given by Herodotus to the Egyptian despot whom the Egyptians themselves called Khufu. He belonged to the rulers who had for their capital Memphis; lived about 2800-2700 B.C., and built the largest of the pyramids. According to Herodotus he employed 100,000 men on this work constantly for 20 years.

**CHEPHREN** (kef'ren), or **CEPHREN**, was the successor of Cheops as king of Egypt, and the builder of the second pyramid. His name is properly Khafra.

**CHEQUE**, or **CHECK**, a draft or bill on a bank payable on presentation. A check may be drawn payable to the bearer, or to the order of some one named: the first form is transferable without endorsement, and payable to any one who presents it; the second must be endorsed, that is the person in whose favor it is drawn must write his name on the back of it. Checks are a very important species of mercantile currency wherever there is a well-organized system of banking. The regular use of them for all payments, except of small amount, makes the transfer of funds a mere matter of cross-entries and transferring of balances among bankers, and tends greatly to economize the use of the precious metals as a currency.

**CHER** (shār), a department of Central France, named from the river Cher, and formed from part of the old provinces of Berry and Bourbonnais; area, 2779 square miles; capital, Bourges. Pop. 355,349.

**CHERBOURG** (shār-bör), a fortified seaport and naval arsenal of France, in the department of La Manche, 196 miles w.n.w. Paris. The fortifications are

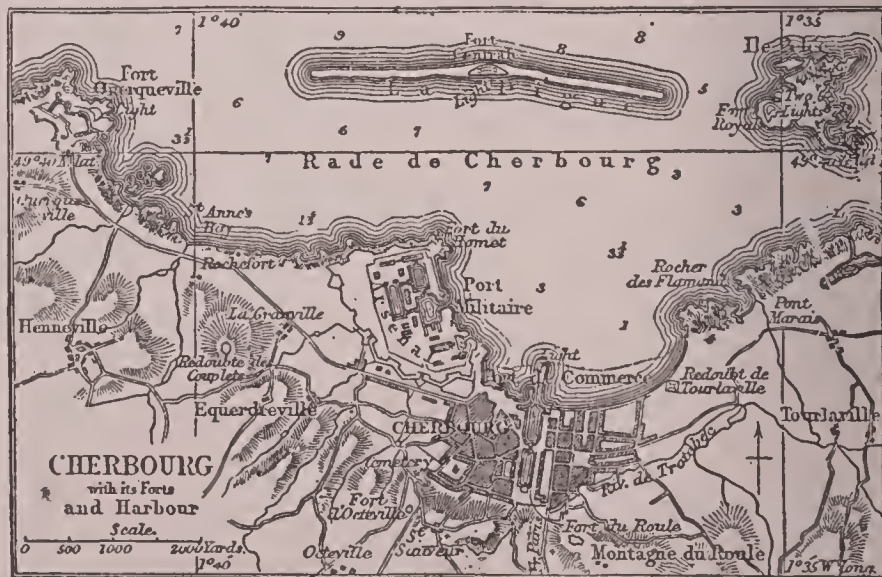
seas from the north. The digue was commenced under Louis XVI., is 4120 yards long, and is 2½ miles from the harbor, in water varying from 42 to 62 feet deep. A fort and lighthouse occupy the center of the digue, and there are circular forts at the extremities. The principal industry of the town is centered in the works of the dockyard, the commercial trade and manufactures being comparatively insignificant. William the Conqueror founded a hospital, and built the castle church. The castle, in which Henry II. frequently resided, was one of the strongholds of Normandy. The town was taken by the British in 1758. Pop. 42,952.

**CHEROKEES**, a tribe of North American Indians occupying an allotted region in the Indian Territory. Their old seats were in Georgia, Alabama, Mississippi, and Tennessee. The Cherokees are the most enlightened of the Indian tribes, have invented an alphabet, printed books and newspapers in their own language, live in well-built villages, and have an excellent school system. Their numbers are about 20,000.

**CHEROOT** (she-röt'), See Cigar.

**CHERRY**, a fruit-tree of the prune or plum tribe. It is a native of most temperate countries of the northern hemisphere. The cultivated varieties probably belong to two species. The fruit of the wild cherry, or gean, is often as well flavored, if not quite so large, as that of the cultivated varieties. It is said that this fruit was brought from Cerasus, in Pontus, to Italy, by Lucullus about B.C. 70, and introduced into England by the Romans about A.D. 46. The cherry is used in making the liquors Kirschwasser and Maraschino. The American wild cherry is a fine large tree, the timber of which is much used by cabinet-makers and others, though the fruit is rather astringent.

**CHERUB** (cher'ub), one of an order of angels variously represented at differ-



very extensive, and have been greatly strengthened in recent years, so that Cherbourg, if not impregnable from the sea, is at least very difficult of attack. There is a great digue or breakwater, stretching across the roadstead, which, though protected on three sides by the land, was formerly open to the heavy

ent times, but generally as winged spirits with a human countenance, and distinguished by their knowledge from the seraphs, whose distinctive quality is love. The first mention of cherubs is in Gen. iii. 24. The cherubs in Ezekiel's vision had each four heads or faces, the hands of a man, and wings. The four



faces were the face of a bull, that of a man, that of a lion, and that of an eagle. (Ezek. iv. and x.) In the celestial hierarchy cherubs are represented as spirits next in order to seraphs.

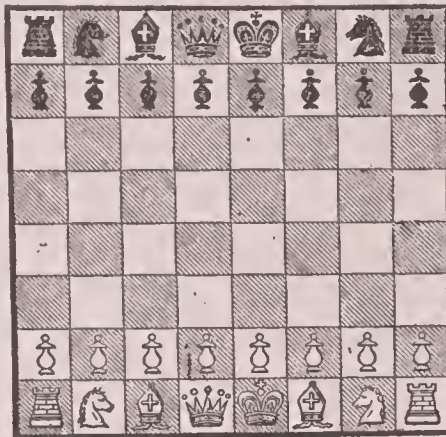
**CHERUBINI** (ke-ryu-be'ne), Maria Luigi Carlo Zenobio Salvatore, an eminent Italian composer, born at Florence in 1760. His first opera, *Quinto Fabio*, was produced in Alessandria in 1780, and in Rome (in an altered form) in 1783, with such success as to spread his fame over Italy. After visiting London he finally settled in Paris, where he became director of the Ecole Royale in 1822, and died in 1842. Among his compositions are *Iphigenia in Aulide*, *Lodoiska*, *Faniska*, *Les Deux Journées*, etc. In his later years he confined himself almost exclusively to the composition of sacred music, and gained a lasting fame by his Coronation Mass, and more especially his gorgeous Requiem.

**CHES'APEAKE BAY**, a spacious bay of North America, in the states of Virginia and Maryland. Its entrance is between Cape Charles and Cape Henry, 16 miles wide, and it extends 180 miles to the northward. It is from 10 to 30 miles broad, and at most places as much as 9 fathoms deep, affording many commodious harbors and a safe and easy navigation. It receives the Susquehanna, Potomac, and James River.

**CHESHIRE** (chesh'ir), or **CHESTER**, a maritime county and county palatine of England, bounded by the counties of Lancaster, York, Derby, Stafford, Salop, Denbigh, Flint, the estuaries of the Dee and Mersey, and the Irish Sea. The area is 657,123 acres, of which only a sixteenth is uncultivated. The surface is generally level, the soil mostly a rich reddish loam variously clayey or sandy. There is some of the finest pasture land in England; and cheese, the main produce of the Cheshire farmer, is made in great quantities. Extensive tracts of land are cultivated as market-gardens, the produce being sent to Liverpool, Manchester, and other towns. Minerals abound, especially rock-salt and coal, which are extensively worked. Cotton manufacture is carried on at Stockport, Stalybridge, and the northeastern district, ship-building at Birkenhead and other places. Pop. 814,555.

**CHESS**, a well-known game of great antiquity and of eastern origin, having probably arisen in India, and thence spread through Persia and Arabia to Europe. The name itself as well as many of the terms used in the game are clearly of eastern origin, the word chess being formed from the old French *eschecs*, from Persian *shâh*, a king; rook is from the Sanskrit *roka*, meaning a ship or chariot; checkmate from Persian *shâh mât*, the king is dead. The game is played by two persons on a board which consists of sixty-four squares arranged in eight rows of eight squares each, alternately black and white. Each player has sixteen men, eight of which, known as pawns, are of the lowest grade; the other eight, called pieces, are of various grades. They are, on each side, king and queen; two bishops, two knights, and two rooks or castles. The board must be placed so that each player

shall have a white square to his right hand. The men are then set upon the two rows of squares next the players; the pieces on the first, the pawns on the second row, leaving between each side four unoccupied rows. The king and queen occupy the central squares facing the corresponding pieces on the opposite side. The queen always occupies her own color, white queen on white square, black on black. The two bishops occupy the squares next the king and queen; the two knights the square next the bishops; the rooks the last or corner squares. The pawns fill indiscriminate-



Chess-board.

ly the squares of the second or front row. The men standing on the king's or queen's side of the board are named respectively king's and queen's men. Thus king's bishop or knight is the bishop or knight on the side of the king. The pawns are named from the pieces in front of which they stand; king's pawn, king's knight's pawn, queen's rook's pawn, etc. The names of the men are contracted as follows:—King, K.; King's Bishop, K.B.; King's Knight, K.Kt.; King's Rook, K.R.; Queen, Q.; Queen's Bishop, Q.B.; Queen's Knight, Q. Kt.; Queen's Rook, Q.R. The pawns are contracted: K.P., Q.P., K.B.P., Q.Kt.P., etc. The board is divided, inversely from the position of each player, into eight rows and eight files. Counting from White's right hand to his left, or from Black's left to his right, each file is named from the piece which occupies its first square, and counting inversely from the position of each player to that of the other, the rows are numbered from 1 to 8. At White's right-hand corner we have thus K.R. square; immediately above this K.R. 2; and so on to K.R. 8, which completes the file; the second file begins with K.Kt. square on the first row, and ends with K.Kt. 8 on the eighth. White's K.R. 8 and K.Kt. 8 are thus Black's K.R. square and K.Kt. square, and the moves of each player are described throughout from his own position, in inverse order to the moves of his opponent.

The definite aim in chess is the reduction to surrender of the opposing king. The K. in chess is supposed to be inviolable, that is, he cannot be taken, he can only be in such a position that if it were any other piece it would be taken. Notice of every direct attack upon him must be given by the adversary saying check, and when the K. is

attacked all other plans must be abandoned, and all other men sacrificed, if necessary, to remove him from danger, cover the attack, or capture the assailant. It is also a fundamental rule of the game that the K. cannot be moved into check. When the K. can no longer be defended on being checked by the adversary, either by moving him out of danger, or by interposing, or by capture, the game is lost, and the adversary announces this by saying checkmate. When, by inadvertence or want of skill, the player having the superior force blocks up his opponent's K. so that he cannot move without going into check, and no other man can be moved without exposing him, the player, reduced to this extremity, cannot, without violating the fundamental rule referred to, play at all. In such a case, the one player being unable to play and the other out of turn, the game is considered drawn, that is, concluded without advantage to either player. The laws of the game must be sought in some special manual. Perhaps the best code is that given in Staunton's Chess Praxis.

**CHEST**, in man and the higher vertebrates, the cavity formed by the breast-bone in front and the ribs and backbone at the sides and behind, shut off from the abdomen below by the diaphragm or midriff. It contains the heart, lungs, etc., and the gullet passes through it. See Thorax.

**CHESTER**, a city in Delaware County, Pa., 14 miles southwest of Philadelphia, on the Delaware River, and on the Baltimore and Ohio, the Pennsylvania, the Philadelphia and Reading railroads. Pop. 39,100.

**CHESTER**, an English parl., county, and municipal borough, county town of Cheshire, situated on the Dee about 16 miles from Liverpool. It is a bishop's see, and contains an old and interesting cathedral recently restored. Pop. 46,204.

**CHESTNUT**, a genus of plants, allied to the beech. The common or Spanish chestnut is a stately tree, with large, handsome, serrated, dark-green leaves. The fruit consists of two or more seeds enveloped in a prickly



Chestnut.

husk. Probably a native of Asia Minor. The tree grows freely and may reach the age of many centuries. Its fruit ripens only in some cases, however, and the chestnuts eaten in Britain are mostly imported. Chestnuts form a staple article of food among the peasants of Spain and Italy. The timber of the tree was formerly more in



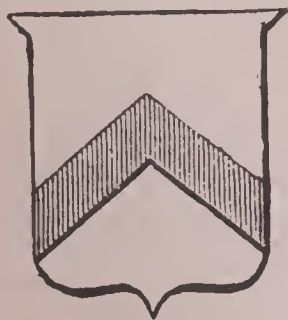
use than it is now; it is inferior to that of the oak, though very similar to it in appearance, especially when old. Two American species of chestnuts, have edible fruits. The former is often regarded as identical with the European tree.—The horse-chestnut is quite a different tree from the common chestnut.

**CHETAH** (chē'ta), or hunting leopard of India, a native of Arabia and Asia Minor. It has its specific name from a short mane-like crest at the back of the head. When used for hunting it is hooded and placed in a car. When a herd of deer is seen, its keeper places its head in the proper direction and removes its hood. It slips from the car, and, approaching its prey in a stealthy manner, springs on it with several bounds. It is about the size of a large greyhound, has a cat-like head, but a body more like a dog's. A slightly different species inhabits Africa.

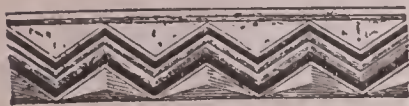
**CHEVALIER** (shē-vā-lyā), Michel, a celebrated economist, born at Limoges in France, Jan. 13, 1806. He was educated as an engineer in the School of Mines. M. Chevalier was sent to the United States and to England on special missions. He became a councilor of state (1838), professor of political economy in the Collège de France (1840), member of the chamber of deputies (1846), and member of the Institute (1851). He was known as a strong advocate of free-trade, and as a specialist on questions of currency. Along with Cobden and Bright he had a great part in the commercial treaty of 1860 between France and Britain. He died in 1879.

**CHEVIOT SHEEP**, a variety of sheep, noted for their large carcass and valuable wool, which qualities, combined with a hardness second only to that of the black-faced breed, constitute them the most valuable race of mountain sheep. The fleece weighs from 3 to 4 lbs., and the carcass of ewes varies from 12 to 16 lbs. per quarter, that of wethers from 16 to 20 lbs.

**CHEVRON**, a heraldic and ornamental form, variously used. In heraldry, the chevron is an ordinary



Chevron.



Chevron molding.

supposed to represent two rafters meeting at top. It is one of charges called honorable ordinaries, and is usually placed as shown in the accompanying cut. A similar form is used for the distinguishing badge worn on the arm of a non-commissioned officer in the

British army. In architecture, the chevron molding consists of a variety of fret ornament of a zigzag form, common in Norman architecture.

**CHEWING-GUM**, a substance, insoluble in saliva, used for continuous exercise of the jaws. It is usually manufactured of paraffin, tolu balsam, and certain resins, sweetened and flavored. The habit is general throughout the United States, men and women indulging freely in it. The chewing of gum is believed to have a beneficial effect upon the digestion.

**CHEYENNE** (shī-yen'), the capital of the state of Wyoming, on the Union Pacific Railway, where it is joined by the Denver Pacific; a rising place. Pop. 17,640.—The river Cheyenne, or Big Cheyenne, a tributary of the Missouri, is formed by two branches, the N. Fork and the S. Fork, which rise in this state, and have the Black Hills between them, each about 300 miles long, the Big Cheyenne being 150 more.

**CHIAPAS** (chī-ā'pās), a state of Mexico on the Pacific coast, area 16,048 square miles. It is in many parts mountainous, is intersected by the river Chiapas, and covered with immense forests. Capital, Tuxtla-Gutierrez. Pop. 363,607.

**CHICA** (chē'ká), a red coloring matter which the Indians on the upper parts of the Orinoco and the Rio Negro prepare from the leaves of a plant native to that region called Bignonia Chica, and with which they paint their skin, in order to be better able to resist the rays of the sun. See Bignonia.

**CHICA** (chē'ká), a kind of beer made from maize, in general use in Chile, Peru, and elsewhere in the mountainous regions of South America. The usual method of preparing it is to steep the maize till it begins to grow, when it is exposed to dry in the sun. The malt thus prepared is then ground, mixed with warm water, and left to ferment. The beer, when ready, has a dark-yellow color, and a pleasant and somewhat bitter and sour taste, and is very intoxicating. Sometimes the Indians instead of grinding the malt chew it, and this variety of the liquor is considered the best. It is the national drink of the Indians, and consumed by them in great quantities. Pito and poso are other names for it.

**CHICAGO**, the second city of the United States in population and commercial and manufacturing importance. It is the metropolis of the west, the largest railroad center in the country, and the head of navigation of the great lakes. Situated on the southwest shore of Lake Michigan, it lies 910 miles from New York, 810 miles from Washington, 910 miles from New Orleans, and 2400 from San Francisco, and has an area of 191 square miles. The city is naturally cut into three divisions, or "sides," the north, the south, and the west sides, by the Chicago River, and its north and south forks. The entire site of Chicago is very flat, its highest point being but a few feet above the level of Lake Michigan. The population is estimated at 2,500,000.

The plan upon which Chicago is laid out was a wise provision of the makers

of the city, who had an eye to its future growth. Its park and boulevard system is unsurpassed by any city in the world. Of parks there are over 2600 acres, the chief being Lincoln Park, with many monuments, Jackson Park, and the newly prospected Grant Park, on the lake front before the main part of the town. Of boulevards, which connect the parks into a system, there are 65 miles of magnificent driveways. The business center is comparatively small, occupying an area less than a mile square, bounded on the e. by the lake and n. and w. by Chicago river. Here are situated most of the great railway dépôts, the post-office, the court-house, the board of trade building and custom-house, the Art Institute, the principal stores, banks, theaters, and hotels, the lofty structures that are the chief architectural features of the city. The shipping business is transacted along the river and the canal, the former having a frontage, including docks, of 41 miles. The livestock and meat industry is carried on at the Union stock-yards, extending from Thirty-ninth Street to Forty-seventh Street, in the geographical center of the city. The value of the products in 1908 was about \$300,000,000.

After several years' agitation and discussion a plan for the construction of a new waterway, 160 feet wide and at least 16 feet deep, from the Chicago river to the Desplaines, and so on to Joliet, was adopted, and the work was begun in 1891. On Jan. 2, 1900, this great canal was opened, the cost to that date having been \$33,525,700. The city is supplied with water from Lake Michigan. Pure water is obtained at "cribs" located from 2 to 4 miles from the shore, and is conveyed thence to the city through five tunnels under the lake. It is distributed by ten pumping works capable of supplying the city with 532,000,000 gals. daily. The cost of the system was \$30,000,000.

The Chicago river is spanned by fifty-four swinging bridges, of from 200 to 250 feet in length, operated by steam. By the elevation of 260 miles of railway tracks and the construction of 254 subways, dangerous grade crossings have been eliminated. Among the public buildings the new post-office and custom house, by Henry Ives Cobb, recently finished, is by far the most picturesque. A new county building has recently been erected and a new city hall is in prospect.

Chicago is the center of twenty-five railroads, has 1500 miles of track, seven depots, and handles 275 through and 800 local trains per day. It has a lake tonnage of 12,600,000, and 450 miles of street railroad of which 50 are elevated.

The Public Library is the largest in the Northwest, containing over 260,000 volumes. It was established in 1873, and is supported by city taxation. It is housed in a magnificent fireproof building on Michigan avenue. It is a free circulating library, with reading and reference rooms. The Newberry Library is named after its founder, Walter L. Newberry, who left in his will for its establishment property from which has been realized over \$2,500,000. It occupies a handsome building facing



Washington Place, on the north side. The library is for reference only, and over 200,000 volumes, many of them rare and costly, have been collected. The Chicago Law Institute has a fine law library in the county building. The Crerar Library, with an endowment of over \$2,000,000 from John Crerar, is to be located on the south side, and, in accordance with the founder's will, must be kept free from sensational and skeptical works.

The city is governed by a mayor, who receives a salary of \$7,000; and a common council, composed of 70 aldermen, whose terms are two years, each of the thirty-five wards into which the city is divided electing one each year.

The manufacturing industries of Chicago are second in magnitude only to those of New York city and are growing rapidly. The total value of manufactures for 1908 was 1,000,000,000. The receipts of grain, and flour in its grain equivalent, aggregate about 350,000,000 bushels yearly.

The principal hotels in the heart of the city are the Auditorium and its Annex, the Great Northern, the Palmer House, the Grand Pacific, the Wellington, the Victoria, Sherman, and the Tremont House; the Virginia, the Metropole, the Lexington, and in course of erection the Blackstone and LaSalle. The "downtown" theaters, with the Auditorium, are Orchestra Hall, McVicker's, the Illinois, Chicago, Garrick, the Grand, Whitney, Powers, the Great Northern, Studebaker, Olympic, Majestic, Colonial, Coliseum, the LaSalle, Princess, and American Music Hall.

Chicago was founded in 1803 with the establishment of Fort Dearborn on the site of the present city. The first village was laid out in 1830, the town was incorporated in 1833, and the city in 1837. On Oct. 8, 1871, the great fire began which in two days virtually wiped out the city. The losses were about \$190,000,000 in property but only a few lives were lost.

**CHICAGO, UNIVERSITY OF**, founded by John D. Rockefeller, in 1889 and situated on the Midway Plaisance in Chicago. It has a productive fund of about \$15,000,000, and an annual outlay of over \$1,000,000. The libraries contain nearly 400,000 volumes, and the registration is about 3000 students. The university offers all degrees except for mechanical and civil engineering, its doctorate of philosophy covering the sciences. It has law, medical, and theological departments and a quadrangle devoted to the biological sciences which cost \$1,000,000 to found. It has ten periodical publications, a faculty of 400 instructors, a school of education, and an academic department. Much of the revenue of the university is derived from its real estate, of which it owns nearly a solid mile fronting the Midway Plaisance.

**CHICKADEE**, the popular name in America of the black-cap titmouse and other allied species, being given from their note.

**CHICKAHOM'INY**, a river in Virginia, rising about 20 miles n.w. of Richmond, flowing s.e. till it joins the James river. Near this river many important battles

during the civil war took place—the battle of Williamsburg, of the Seven Pines, of Gaines's Mill, etc.

**CHICKAMAUGA**, a small tributary of the Tennessee river, state of Tennessee, U. States, where a battle took place Sept. 19–20, 1863, between the Federal troops under Rosecrans and the Confederates under Bragg and Longstreet, the latter gaining the victory.

**CHICKAMAUGA NATIONAL PARK**, a military park on the site of the Battle of Chickamauga, near Chattanooga on the Georgia-Tennessee line. It has an area of 15 sq. miles and is laid out as nearly as possible to conform to the state of affairs at the time of the battle itself. The park was dedicated Sept., 1895, since which time a number of fine monuments have been erected in it by the different states. The cost of the improvements was upward of \$1,000,000, three-fourths of which was appropriated by Congress, the remainder by the separate states.

**CHICKASAW INDIANS**, a tribe of American Indians of the Appalachian nation. In 1833 they gave up to the United States the last of their lands south of the Tennessee river, receiving as compensation a money indemnity and new lands on the left bank of the Red river, in the Indian Territory. The Chickasaws number about 8000. They have made considerable advances toward civilization, have a senate, house of representatives, and more than a million dollars in deposit with the Union government.

**CHICKEN-BREASTED**, having that form of breast, resulting from malformation or from carious disease or spinal weakness, in which the vertebral column is curved forward, giving rise to projection of the sternum or breast-bone.

**CHICKEN-POX**, an infectious disease mainly confined to children. It commences with feverishness, and an eruption of pimples, which speedily become blebs filled with clear fluid and as large as split-peas. Within a week these dry up into dark-colored scabs, which within another week have fallen off. The disease is never fatal, and has no evil results. A little opening medicine and a mild diet is all the treatment requires.

**CHICK'ERING**, Jonas, born 1737, a self-taught piano maker of Boston, who eventually established the largest piano manufactory in the U. States. He was greatly esteemed for his public spirit and benevolence. He died 1853.

**CHICK'WEED**, the popular name of one of the most common weeds. It has a procumbent more or less hairy stem, with ovate pointed leaves, and many small white flowers. It is much used for feeding cage-birds, which are very fond both of its leaves and reeds.

**CHIC'OPEE**, a city in Hampden Co., Mass., three miles north of Springfield, on the east side of the Connecticut river, at the mouth of the Chicopee, and on the Boston and Maine Railroad. Pop. 19,167.

**CHIC'ORY**, a genus of composite plants. The leaves are sometimes blanched, to be used as salad. But the most important part of the plant is its long, fleshy, and milky root, which when

roasted and ground is now extensively used for mixing with coffee. Its presence among coffee may easily be detected by putting a spoonful of the mixture into a glass of clear cold water,



Chicory.

when the coffee will float on the surface, and the chicory separate and discolor the water as it subsides.

**CHIEF-JUSTICE**, the presiding judge of a judicial body. In England the chief justice is the superior judge of the king's bench and of the court of common pleas. In the U. States he is the presiding judge of the United States Supreme Court—of a state supreme court. The chief justice of the Federal Supreme Court administers the oath of office to the president.

**CHIGNON** (shēn-yōn), a French word, properly signifying the nape of the neck, now used in English and other languages to denote ladies' back hair when raised and folded up, usually round a pad, in a sort of roll on the back part of the head.

**CHIH-LE** (chi-lē'), or **PE-CHI-LE**, one of the northern provinces of China, watered by the Pei-ho, containing Peking, the imperial capital. Area about 59,000 sq. miles; pop. 18,000,000.

**CHIHUAHUA** (chē-wā'wā), a city, Mexican Confederation, capital of the state of the same name, generally well built, and supplied with water by a notable aqueduct. It is surrounded by silver mines, and is an important entrepôt of trade. Pop. about 18,279.—The state is bounded on the n. by the U. States, and on the n.e. by the Rio Grande del Norte; has a healthy climate, and is rich in silver mines. Pop. 327,004.

**CHIL'BLAINS** are painful inflammatory swellings, of a deep purple or leaden color, to which the fingers, toes, heels, and other extreme parts of the body are subject on being exposed to a severe degree of cold. The pain is not constant, but rather pungent and shooting at particular times, and an insupportable itching attends it. In some instances the skin remains entire, but in others it breaks and discharges a thin fluid. Compound camphor liniment is a useful application, and the parts should be kept warm.

**CHILDBIRTH**. See Birth.

**CHILD LABOR**, the employment of children under the age provided by law at which children are allowed to work. Child labor is one of the most distressing problems of social life. Although the



law forbids it, yet poverty compels it, and both employers and employed thus conspire to defeat the laws which, in most states, in virtually all, are really a dead letter. Very young children are employed in mines, offices, stores, factories of many kinds, and, in a word, in all trades or occupations in which they can be used. Disease, stunted growth, defectiveness, moral ruin and general vitiation are some of the results. Before this great wrong society stands avowedly helpless.

**CHILDREN, SOCIETIES FOR THE BENEFIT OF**, associations to care for homeless children, to prevent cruelty to (see Bergh, Henry), to encourage the industry of children, and to relieve diseased or crippled children. In the U. States vast sums of wealth are devoted to these various designs.

**CHILDS**, George William, an American philanthropist and journalist, born in Baltimore in 1829, died in 1894. In 1864 he purchased the Philadelphia Public Ledger and soon became quite rich. His gifts to charity and education were exceedingly large.

**CHILI**, or **CHILE** (chē'lē, chē'lā), a country of S. America, extending along the Pacific coast from lat. 18° s. nearly to Cape Horn, and including Chiloé and many other islands and part of Tierra del Fuego. It is bounded on the n. by Peru (the river Sama being the boundary), on the n.e. and e. by Bolivia and the Argentine Republic, from which it is separated by the chief range of the Cordilleras. Its length from n. to s. is about 2400 miles; its breadth, on an average 120 miles; area, 293,310 sq. miles, divided into a number of provinces and territories; pop. 3,110,085. By the war with Peru and Bolivia which terminated in 1882 Chili gained all the sea-board of Bolivia, and annexed also the Peruvian provinces of Tarapaca and Tacna. The chief towns are Santiago or St. Jago (the capital) and Valparaiso. The rivers are numerous, but small, and have generally rapid currents. The surface is greatly diversified, but rises in elevation as it recedes from the coast and approaches the Andes, along the watershed of which great part of the boundary runs. Some of the summits here rise to 20,000 feet or more, but the elevation decreases toward the south. Chiloé and numerous other islands fringe the coast in the south. Earthquakes are common, those of 1822, 1835, and 1868 being particularly violent. In the Chilean Andes there are twenty volcanoes at least, three of which (Antuco, Villarcia, and Osorno) are still active. The climate is remarkably salubrious. In the northern provinces it rarely rains—in some parts perhaps never; in the central parts rain is sufficiently abundant, while in the extreme south there is even an excess of moisture. Among the minerals of Chili are gold, silver, copper, lead, iron, zinc, antimony, manganese, arsenic, tin, sulphur, alum, salt, and cubic nitre. Silver and copper are the two most important metals. The copper mines are most numerous in the northern districts. The cubic niter, or Chili saltpeter, is a great source of wealth. Coal is mined at several places. From the 29th

degree of latitude southward green valleys and fertile tracts appear, the character of the vegetation getting always richer, till in the southern provinces we find the sides of the Andes clothed with forests and with herbaceous plants and flowers of the richest and most beautiful hues. In some of the northern districts maize is cultivated; in the southern districts wheat and barley are the chief agricultural products. Fruits are abundant—apples, pears, apricots, peaches, figs, grapes, oranges, water-melons, etc. The wild animals include the guanaco, puma, or



Costumes of the environs of Santiago.

American lion, the chinchilla, coypu, deer, etc. Cattle are raised in great numbers, from 4000 to 20,000 being sometimes reared on one farm. The manufactures are of little importance. Mineral products form five-sixths of the total exports, the principal article being cubic niter (or Chili saltpeter) next come copper, iodine, wheat, silver, etc.

Chili is a republic, and is considered the best regulated in S. America. It is under a president elected for five years and a council of state. The legislature is composed of a senate elected for six years, and a house of deputies elected for three years. The army numbers about 6000 men; the chief vessels of the navy are three iron-clads and five protected cruisers. The Chileans are mostly of Spanish or Indian descent.

Chili originally belonged to the Incas of Peru, from whom it was wrested by the Spaniards under Pizarro and Almagro in 1535. From this period Chili continued a colony of Spain till 1810, when a revolution commenced, which terminated in 1817 in the independence of Chili. Several internal commotions have since occurred; but the country has been free from these compared with other S. American states. A war begun with Spain in 1865 led to the blockade of the coast by the Spanish fleet, and the bombardment of Valparaiso in 1866. In 1879–81 a war was successfully waged with Bolivia and Peru, in reference to the rights of Chili in the mineral district of Atacama. In 1891 an insurrection arose against President Balmaceda's administration, a movement which resulted in his overthrow and suicide. Since which time the country has been prosperous and peaceful.

The earthquakes in Chili are very severe. The last one of importance oc-

curred on Aug. 5, 1906, and continued for several days. More than 500 people were killed and a property loss of \$8,000,000 was sustained, none of which was insured.

**CHILLED IRON**, iron cast in metal molds called chills, where, on account of the rapid conducting of the heat, the iron cools more quickly on the surface than it would do if cast in sand. Chilled iron is whiter and has a harder surface than iron cast in any other way.

**CHILLICOTHE** (-koth'e), a town in Ohio, on the west bank of the Scioto, with manufacturing and other industries. Pop. 15,488.

**CHILTERN HILLS**, a range of flint and chalk hills, England, extending through Oxford, Hertford, and Buckingham shires, loftiest summit 905 feet. These hills were anciently covered with forests, and were infested by numerous bands of robbers. To protect the inhabitants of the neighboring districts an officer was appointed by the crown, called the Steward of the Chiltern Hundreds, and although the duties and emoluments have long ceased the office still exists, and is made use of to afford members of the House of Commons (who cannot give up their seats directly) an opportunity of resigning their seats when they desire to do so. Being regarded as an appointment of honor and profit under government, the acceptance of it disqualifies a member from retaining his seat.

**CHIMÆRA** (ki-mē'ra), in class. myth. a fire-breathing monster, the foreparts of whose body were those of a lion, the middle of a goat, and the hinder of a dragon. Thus the name came to be used for an unnatural production of the fancy.

**CHIMES**, a species of music, mechanically produced by the strokes of hammers against a series of bells, tuned agreeably to a given musical scale. The hammers are lifted by levers acted upon by metallic pins, or wooden pegs, stuck into a large barrel, which is made to revolve by clock-work, and is so connected with the striking part of the clock mechanism that it is set in motion by it at certain intervals of time, usually every hour, or every quarter of an hour. The chime mechanism is sometimes so constructed that it may be played like a piano.

**CHIMNEY**, an erection generally of stone or brick containing a passage by which the smoke of a fire or furnace escapes to the open air. In this sense the first chimneys we hear of are no earlier than the middle ages. The longer a chimney is the more perfect is its draught, provided the fire is great enough to heat the column of air in it, because the tendency of the smoke to draw upward is in proportion to the difference of weight between the heated air in a chimney and an equal column of external air.

**CHIMNEY-SWALLOW**. See Swallow.

**CHIMPANZEE**, the native Guinea name of a large West and Central African ape belonging to the anthropoid or man-like monkeys, and to the same genus as the gorilla. When full grown it is sometimes about 5 feet high, with black hair, and is not so large and powerful as the gorilla. Like the orang it has





# CHINA, JAPAN & KOREA.

SCALE OF MILES  
0 100 200 300 400 500

Capital of Country .....  
Capital of Province .....  
Treaty Ports .....  
Railroads .....  
Proposed Railroads .....  
Submarine Cables .....

Hammond, C. S. & Co. 11 Map of China, Japan and Korea  
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Longitude 120 East from I Greenwich 125 J 130 K 135 L







the hair on its forearm turned backward, but differs from it in having an additional dorsal vertebra and a thirteenth pair of ribs. It walks erect better than most of the apes. It feeds on



Chimpanzee.

fruits, often robs the gardens of the natives, and constructs a sort of nest among the branches. It is common in menageries, where it shows much intelligence and docility.

**CHINA**, an immense empire stretching from the center of Asia, about 75° e. lon., for 3000 miles to the east coast of Corea, in 128° e. lon.; and from the Siberian frontier at the river Amoor, about 50° 30' n. lat., for 2400 miles southward to the island of Hainan. This vast empire, second in magnitude only to that of Russia and Great Britain, has an area of about 4,500,000 sq. miles, and a population variously estimated at 300,000,000 and 400,000,000, or more, and is usually divided into China Proper, and the dependencies: Manchuria, Mongolia, Eastern Turkestan, Dzungaria, and Tibet, of which Tibet is practically autonomous. The dependencies, though they cover more than 3,000,000 sq. miles, contain but a small and relatively unimportant part of the

most remarkable of human structures, being an artificial barrier 1500 miles long. Two thirds of the interior are estimated to be mountainous. The general slope is from west to east, and the mountains are a continuation of those of Tibet and Central Asia. The great Kuen-lun range throws off branches, the Tsing-Ling, Fu-niu-shan and Mu-ling, which, running eastward between the great valleys of the Hoang-Ho and Yang-tse-kiang, traverse almost the whole breadth of China. Further north the Nan-shan branch of the Kuen-lun range runs under various names (Kuliang, Alashan, Inshan, etc.) along the northeast of China till it reaches the frontier of Manchuria, north of Peking. The third great mountain system of China is in the southeast, where extensive chains such as the Nanshan, the Ta-yu-ling, and Pu-ling stretch on the south side of the Yang-tse-kiang all the way form the highlands of Yunnan to the eastern sea-board. The two great rivers of China are the Hoang-ho and the Yang-tse-kiang. Here lie the central and richest provinces of China. On both sides of the lower Hoang-ho is an immense delta plain, consisting generally of a deep alluvial soil of unparalleled fertility. As they approach the sea-coast the two rivers are connected by the Grand Canal, 700 miles in length, thus completing a magnificent system of inland navigation.

The greater part of China belongs to the temperate zone, but it has what is called an excessive climate. At Peking in summer the heat ranges from 90° to 100° in the shade, while the winter is so cold that the rivers are usually frozen from December to March. At Shanghai, lat. 31° 20', the maximum temperature reaches 100°, and the minimum falls at least to 20° below freezing point (12° Fahr.). In the south the climate is of a tropical character, the summer heat

haustible beds of kaolin, or porcelain earth. Among animals it is difficult to mention any that are characteristic of the country; many of them are identical with or differ but little from those of Europe. Among birds the most beautiful are the gold and silver pheasants. Fish swarm in all inland waters as well as on the coast, the natural supply being immensely increased by artificial means. As regards the flora of China, it is tropical in the south (coco and sago palms, banana, pandanus, etc.), sub-tropical farther north, and still farther north prevails a number of plants and trees identical with or closely akin to those of middle Europe. Flowering plants, shrubs, and trees are so exceedingly abundant as to form a feature. The bamboo, from the immense number of uses to which it is put, is one of the most valuable trees. Oaks, the chestnut, hazel, pines, yew, walnut, etc., are among forest trees. Wax and camphor trees abound. Azaleas are exceedingly numerous; other flowering plants are the camellia rose, passion-flower, cactus, lagerstroemia, etc. Fruits are abundant and varied. Rice, as the principal food of the people, is the staple crop. Three plants of the greatest economical importance to China are the mulberry, cultivated to provide food for silkworms, cotton, and tea, the last for long regarded as exclusively a Chinese product. Another important crop is the opium poppy, which is extensively grown, though the product is inferior to that of India.

Among the chief industries is the silk manufacture, which produces some varieties of stuffs unsurpassed anywhere. The porcelain of China has been famous from the earliest periods, and the manufacture of the finest forms of it was long known to the Chinese alone, though their productions are now surpassed by those of Europe. Paper is made of a great variety of substances, and the art of making it—like various others—was practiced in China long before Europe acquired it.

The inland trade of China, aided by its vast system of water communication, is of incalculable magnitude, the rivers and canals literally swarming with junks, barges, and boats of all sizes. The chief of ports are: Shanghai (by far the first), Canton, Hankow, Swatow, Tientsin, Ningpo, and Foo-chow. The main articles of export are tea and raw and manufactured silk; the main imports, cotton goods, opium, metals and metal goods. The total exports and imports have increased considerably in recent years. The chief article of export is tea. The quantity of opium imported, almost wholly from India, reaches the value of \$30,000,000 annually. Silver bullion, called sycee, and gold bullion, usually stamped with the name of the banker and the year and district in which it is cast, are used in larger transactions.

The Chinese belong to the Mongolian race, but in them its harsher features, as represented in the genuine Tartars, are considerably softened. They are generally of low stature, have small hands and feet (the last artificially made so small in the females as to become a



Chinese mandarin, lady, boy, female attendant, soldier, and bird's-nest seller.

population (about 30,000,000), China Proper being the center of power and population.

Great part of the country is not well known. The coast-line forms an irregular curve of about 2500 miles. The inland boundaries are formed mainly by Tonquin, Burmah, Tibet, and, on the north, partly by the Great Wall separating China from Mongolia, one of the

rising to 120°. Here the southwest and northeast monsoons blow with great regularity, and divide the year between them.

China is well supplied with minerals, including gold, silver, copper, iron, and other metals, and there are very extensive coal-fields, though the quantity raised from them is comparatively small. Salt is abundant, and there are inex-



deformity), a dark complexion, a wide forehead, black hair, eyes and eyebrows obliquely turned upward at the outer extremities. They are strongly attached to their homes, hold age in respect, toil hard for the support of their families, and in the interior, where the worst kind of foreign intercourse has not debased them, exhibit an unsophisticated simplicity of manners which recalls the age of the patriarchs. The Chinese use great politeness in their intercourse with each other. They scrupulously avoid all contradiction and offensive expressions in conversation. Drunkenness has hitherto been rare among them, but the habit of opium-smoking has much extended of late. Hard work, done in the most uncomplaining way, has become second nature with them. Filial piety is also a striking feature of their character, and is, in fact, the principle upon which Chinese society is constituted. They have chambers set apart for the worship of their ancestors, where religious ceremonies are regularly performed.

The Chinese is the most important and most widely spread of the so-called monosyllabic languages of eastern Asia, in which each word is uttered by a single movement of the organs of speech. There is no alphabet, each word being represented by a single symbol or character. The chief religions in China are Confucianism, Taoism, and Buddhism, the last introduced subsequently to the others. In the western parts Mohammedanism has many followers.

Government, Administration, etc.—The government is an absolute despotism. The reigning dynasty is of Manchu-Tartar blood. The monarch unites in his person the attributes of supreme magistrate and sovereign pontiff, and as the "Son of Heaven" is in theory accountable only to heaven. Four principal ministers, two of whom are Manchus and two Chinese, form, along with two assistants, the inner council of state. The Chinese army is said to number 300,000 men on a peace footing, and 1,000,000 on a war footing, but only a small proportion of these are of any value for actual service, the great bulk of the men having received no proper military training or discipline and being equipped only with obsolete weapons. The navy consists of two fleets—one for rivers and another for sea; but though it numbers many vessels it is not very efficient, and is scarcely able to clear the Chinese coast from the pirates who infest the creeks and islets.

The early history of the Chinese is shrouded in fable, but it is certain that civilization had advanced much among them when it was only beginning to dawn on the nations of Europe. The Chow dynasty, which was founded by Woo-wang, and lasted from about 1100 B.C. to 258 B.C., is perhaps the earliest that can be regarded as historic, and even of it not much more is historic than the name. The present reigning house is of Manchu origin. European relations with the Chinese began in 1596 and European interference has gone on uninterruptedly ever since. The Chinese are refractive to European civilization and have resisted intercourse persist-

ently. In spite of this, however, every European nation of importance has secured a foothold in China. In 1850 began the great Tai Ping rebellion against the government. In 1894-5 was fought the Japanese-Chinese war resulting in the defeat of China, the payment of an indemnity and the relinquishment of Formosa to Japan. In 1900 an anti-foreign movement broke out in north China, mainly instigated, it would seem, by a secret nationalist society, whose members are known to Europeans as the Boxers. Native Christians and European and other missionaries were murdered; and for a time the members of the legations in Peking were isolated and in danger of being massacred. An international relief force, however, succeeded in effecting their rescue. Tsi-Au, the empress dowager, died in November, 1908, the emperor was poisoned and another infant, Pu-Yi ascended the throne.

**CHINA ASTER**, the common name of a composite plant, hardy and free flowering. See Asters.

**CHINA GRASS**, a plant of the nettle family, a native of southern and eastern Asia and the Asiatic islands, and now more or less cultivated in many other countries, such as southern France, Algeria, Natal, Mauritius, Australia, the U. States, Mexico, Jamaica, etc. It yields a fiber which possesses most valuable properties, and has long been made in China into a beautiful cloth, and is probably destined to play a much more important part as a textile material. It is very strong, presents unusual resistance to the effects of moisture, and is fine and silky in appearance. With wool, hemp, cotton, and flax it is believed that it may successfully compete, but its full capabilities are hardly as yet known, though it is long since trials have been made with it as a subject of manufacture.

**CHINA, GREAT WALL OF**, the largest artificial structure on the face of the earth, a barrier extending for about 1500 miles in the north of China proper, of which it partly forms the boundary. Its western end is in the deserts of central Asia, its eastern reaches the sea to the north-eastward of Peking. It was erected as a barrier against the inroads of the barbarous tribes, and dates from about 214 B.C. It is carried over height and hollow, and avoids no inequality of the ground, reaching in one place the height of over 5000 ft. above the sea. Earth, gravel, brick, and stone were used in its construction, and in some places it is much more substantial than in others. Its greatest height, including the parapet on its top, is about 50 feet, and it is strengthened by towers at regular distances.

**CHINA INK**, a black solid, which, when rubbed down with water, forms a very pure black indelible ink. It has been used in China from time immemorial. There are different accounts of the process, but it appears to be made by boiling the juices of certain plants with water to a syrup, adding to this a quantity of gelatine, and then thoroughly incorporating the carbonaceous matter. There is generally added some perfume—a little musk or camphor. The mass

is then made into square columns of different sizes, which are often decorated with figures and Chinese characters. Many attempts have been made to imitate Chinese ink, some of which have been tolerably successful. Good Chinese ink should have a velvety-black appearance, with a gloss which becomes very conspicuous on rubbing. The color it gives on paper should be pure black and homogeneous, and if water be passed over it it should not run or become streaky. It is indelible by ordinary solvents, but may be removed sometimes mechanically.

**CHINA ROSE**, the name given to a number of varieties of garden rose.

**CHINA SEA**, that part of the North Pacific Ocean bounded n. by Formosa, n.w. by China, w. by Anam and the Malay Peninsula, s.e. by Borneo, and e. by the Philippines. It contains numerous islands, receives several considerable rivers, and forms the important Gulfs of Siam and Tonquin.

**CHINA-WARE**, porcelain, the finest and most beautiful of all the kinds of earthenware, so called from China being the country which first supplied it to Europeans. The Chinese are said to have manufactured porcelain previous to the Christian era, but it was not till five or six centuries later that they attained any great perfection in the art. Japan also appears to have been early acquainted with the manufacture. In the beginning of the 16th century the ware was first introduced into Europe, and won immediate popularity by its beauty and novelty. For long it was thought impossible to fabricate anything similar in Europe, but at length John Frederick Böttcher or Böttiger, a native of Saxony who had long devoted himself to alchemy, discovered a means of producing a porcelain equal in whiteness to that of China. This led to the establishment by the government of the far-famed porcelain manufactory at Meissen, near Dresden. The Saxon porcelain soon became celebrated over Europe, and rivalled that of China in the excellence of its quality, and the beauty of its decorations. Subsequently porcelain works were established at Vienna, Munich and elsewhere in Germany. In France also about the middle of the 18th century the celebrated factory at Sèvres was set up and soon acquired a great renown. The first successful attempt in England to manufacture porcelain was made by some Germans, who established a factory at Chelsea, from which, in 1748, it was transferred to Derby. About twenty years afterward the valuable discovery in Cornwall of an excellent species of clay contributed greatly to improve the quality of English porcelain, which now began to be largely manufactured in Staffordshire under the auspices of the celebrated Josiah Wedgwood. China-ware, when broken, presents a granular surface, with a texture compact, dense, firm, hard, vitreous, and durable. It is semi-transparent, with a covering of, white glass, clear, smooth, unaffected by all acids excepting the hydrofluoric, and resisting uninjured sudden changes of temperature. For the process of manufacture see Pottery.



**CHINA WAX**, a sort of wax deposited by insects on a deciduous tree with light-green ovate, serrated leaves, cultivated in the province of Si-chuen (Ssu-chuan) in south-western China. The insects, a species of *Coccus*, are bred in galls which are formed on a different tree, an evergreen (a species of *Ligustrum* or privet), and these galls are transported in great quantities to the districts where the wax trees are grown, to the branches of which they are suspended. Having emerged from the galls the insects spread themselves over the branches, which gradually become coated with a white waxy substance, reaching in 90 or 100 days the thickness of a quarter of an inch. The branches are then lopped off and the wax removed. It is white in color and is chiefly made into candles; it melts at 160° whereas tallow melts at about 95°.

**CHINCH**, the popular name of certain fetid American insects, resembling the bed-bug, very destructive to wheat, maize, etc., in the southern and western states. Also applied to the common bed-bug.

**CHINCHIL'LA**, a genus of S. American herbivorous rodents very closely allied to the rabbit, which they resemble in the general shape of the body, in the limbs being longer behind than before, in the conformation of the rootless molars, and by the nature of the fur, which is more woolly than silky; but differing from the rabbit in the number of their incisors and molars, in a greater length of tail, and also in having broader and more rounded ears. One species about 15 inches long, is covered with a beautiful pearly-gray fur, which is highly esteemed as stuff for muffs, pelisses, linings, etc. The chinchilla



Chinchilla.

lives gregariously in the mountains of most parts of S. America, and makes numerous and very deep burrows. It is of a gentle nature, very sportive, losing none of its gaiety in captivity, and very cleanly.

**CHINCHONA** (chin-chō'ná). See Cinchona.

**CHINESE EDIBLE DOG**, a small dog, in form somewhat like a greyhound, reared by the Chinese to be used as an article of food.

**CHINESE IMMIGRATION**, a political question in the U. States, arising from a fear that American labor would be injured by imported labor from China. In 1882 the Chinese exclusion act was passed by congress and has been continued in force ever since. By its provision all Chinese are excluded except those who are certified not to be laborers. In 1900 there were 89,863 Chinese in the U. States.

**CHINESE LANTERN**, a lantern made of thin paper, usually variously colored and much used in illuminations.

**CHINESE WHITE**, oxide of zinc used in the arts instead of white lead. It is valuable principally as a color.

**CHING'LEPUT** (ching'gl-put), or **CHENGALPAT**, a coast district, and its capital, Hindustan, presidency Madras. The district, which lies s. of Arcot and Madras—area, about 2842 sq. miles. Pop. 1,136,928.

**CHINIQUEY**, Charles Pascal Telephore, a Canadian clergyman, born in Quebec in 1809, died in 1899. He took part in the temperance crusade of 1846 and in 1851 established a Roman Catholic colony at Kankakee, Ill. He published *Fifty Years in the Church of Rome*.

**CHIN-KIANG**, or **TCHANG-KIANG**, a city, China, province of Kiangsu. Pop. 135,000.

**CHINOOK**, a dialect consisting of English, Chinook and other Indian tongues, used largely as a trade language on the Pacific coast.

**CHINTZ**, cotton cloth or calico printed with flowers or other devices in various colors and now generally glazed. Originally a manufacture of the East Indies it is now largely manufactured in Europe.

**CHIP'MUNK**, **CHIP'MUCK**, the popular name in America of the ground-squirrel.



Chipmunk.

**CHIPPEWAYS** (chip'e-wāz), or **OJIB-BEWAYS**, a tribe of N. American Indians, U. States and Canada. They are distributed in bands round both sides of the basin of Lake Superior, where they once owned vast tracts. They are of the Algonquin stock, tall, active, and well formed, subsist chiefly by hunting and fishing, and number about 18,000.

**CHIPPING SPARROW**, a common N. American bird, some five or six inches long.

**CHIRAGRA** (kī-rag'ra), that species of gout which attacks the joints of the hand (the wrist and knuckles) and hinders their motions. It gradually bends, distorts, and finally stiffens the fingers.

**CHIROMANCY** (kī-ro-man-si). See Cheiromancy.

**CHISHOLM VS. GEORGIA**, a celebrated case decided by the Supreme Court of the U. States in 1793, in which the court decided that the federal judiciary could not exercise power in an action brought by a citizen of one state against the government of another state.

**CHISHOLM**, William Wallace, an American politician, born in Georgia in 1830, died 1877. He was a fierce partisan republican in Georgia and in 1877 was arrested charged with having murdered John W. Gully, a democratic leader. Chisholm was attacked in jail by a mob and shot to death.

**CHITTAGONG** (chit'-), a district, Hindustan, in the s.e. of Bengal, having the Bay of Bengal on the w.; area, 2563 sq. miles; pop. 1,290,167. Chittagong is also the name of a commissionership or division of Bengal. Area, 12,118 sq. miles; pop. 4,190,081.

**CHIVALRY** (chiv'al-ri), a term which indicates strictly the organization of knighthood as it existed in the middle ages, and in a general sense the spirit and aims which distinguished the knights of those times. The chief characteristics of the chivalric ages were a warlike spirit, a lofty devotion to the female sex, a love of adventure, and an undefinable thirst for glory. The Crusades gave for a time a religious turn to the spirit of chivalry, and various religious orders of knighthood arose, such as the Knights of St. John, the Templars, the Teutonic Knights, etc.

**CHLO'RAL**, a liquid first prepared by Liebig by passing dry chlorine gas through absolute alcohol to saturation, afterward by Städeler by the action of hydrochloric acid and manganese on starch. The hydrate of chloral, as now prepared, is a white crystalline substance, which, in contact with alkalis, separates into chloroform and formic acid. Chloral kills by paralyzing the action of the heart. It is a hypnotic as well as an anæsthetic, and is frequently substituted for morphia. It has been successfully used in delirium tremens, St. Vitus's dance, poisoning by strychnia, in tetanus, and in some cases of asthma and whooping-cough. It should be taken with great caution and under medical advice, as an extra dose may produce serious symptoms and even death. The treatment of poisoning by chloral is to keep the person warm by means of blankets, warm bottles, etc. Warm stimulating drinks should also be administered, such as hot coffee, hot tea, negus, etc. It has been shown that an animal kept warm by wrapping in cotton wool recovered from a dose of chloral that otherwise would have killed it.

**CHLO'RATE**, a salt of chloric acid. The chlorates are very analogous to the nitrates. They are decomposed by a red heat, nearly all of them being converted into metallic chlorides, with evolution of pure oxygen. They deflagrate with inflammable substances with such facility that an explosion is produced by slight causes. The chlorates of sodium and potassium are used in medicine. The latter, in doses of from five to twenty grains, is largely used in scarlet fever, inflamed throat, etc. It is also used in the manufacture of lucifer-matches, fireworks, and percussion-caps.

**CHLORIC ETHER**, a volatile liquid obtained by passing hydrochloric acid gas into alcohol to saturation and distilling the products.



**CHLORIDE OF LIME.** See Bleaching-powder.

**CHLORIM'ETRY**, the process of testing the bleaching power of any combination of chlorine, but especially of the commercial articles, the chlorides of lime, potash and soda.

**CHLO'RINE** is a very heavy gas, being about two and a half times as heavy as ordinary air; it has a peculiar smell, and irritates the nostrils most violently when inhaled, as also the windpipe and lungs. It exercises a corrosive action upon organic tissues. It is not combustible, though it supports the combustion of many bodies, and, indeed, spontaneously burns several. In combination with other elements it forms chlorides, which act most important parts in many manufacturing processes. This gas may be liquefied by cold and pressure, when it becomes a transparent, greenish-yellow, limpid liquid. Chlorine is one of the most powerful bleaching agents, this property belonging to it through its strong affinity for hydrogen. It is a valuable disinfectant where it can be conveniently applied, as in the form of chloride of lime.

**CHLO'RODYNE**, a popular patent medicine used in allaying pain and inducing sleep, and containing morphia, chloroform, prussic acid, extract of Indian hemp, etc. There are several makes of it, but all have to be used with caution.

**CHLO'ROFORM**, a volatile colorless liquid of an agreeable, fragrant, sweetish apple taste and smell, discovered by Soubeiran and Liebig in 1832. It is prepared by cautiously distilling together a mixture of alcohol, water, and chloride of lime or bleaching-powder. Its use as an anæsthetic was introduced in 1847 by Prof. Simpson of Edinburgh. For this purpose its vapor is inhaled. The inhalation of chloroform first produces slight intoxication; then, frequently, slight muscular contractions, unruliness, and dreaming; then loss of voluntary motion and consciousness, the patient appearing as if sound asleep; and at last, if too much be given, death by coma and syncope. When skilfully administered in proper cases it is considered one of the safest of anæsthetics; but it requires to be used under certain precautions, as its application has frequently proved fatal. Chloroform is a powerful solvent, dissolving resins, wax, iodine, etc., as well as strychnine and other alkaloids.

**CHLORO'SIS** or **GREEN SICKNESS**, a disease specially affecting young girls, is characterized by a greenish or yellowish hue of the skin, languor, indigestion and general debility, and derangement of the system. The pathological condition of chlorosis is a diminution in quantity of the red globules of the blood, an important constituent of which is iron, and accordingly the administration of iron forms a leading part of the treatment of this disease. —The term is also applied to a disease of plants in which a deficiency of chlorophyll causes a blanched and yellow appearance instead of a healthy green in the plant. It is artificially produced in some esculent vegetables to destroy their bitter flavor.

**CHOATE**, Joseph Hodges, an American diplomat and lawyer, born in Massachusetts in 1832. He became noted for his part as counsel for the defense in the Tweed Ring case, the Tilden will contest and the Chinese exclusion case. He represented the U. States in the Bering Sea dispute, and in 1899 was appointed ambassador to England.

**CHOATE**, Rufus, a noted American lawyer, born in Massachusetts in 1799, died in 1859. He was a member of the



Rufus Choate.

U. States senate for some years and was an ardent advocate of protection. Choate was particularly noted for his fine oratory.

**CHO'COLATE**, a paste composed of the kernels of the Theobroma Cacao or cacao-tree, ground and combined with sugar and vanilla, cinnamon, or other flavoring substance; also a beverage made by dissolving chocolate in boiling water or milk. It was used in Mexico long before the arrival of the Spaniards, and is now largely used.

**CHOCTAWS**, a N. American Indian tribe now settled on a portion (10,450 sq. miles) of the Indian Territory on the Red river. They formerly inhabited what is now the w. part of Alabama and s. part of Mississippi. They cultivate the soil, are partially civilized, having a regular constitution prefaced with a bill of rights, courts of justice, books and newspapers.

**CHOIR** (quîr), that part of a cruciform church extending eastward from the nave to the altar, frequently inclosed by a screen, and set apart for the performance of the ordinary service. The name is also given to the organized body of singers in church services.

**CHOKE-CHERRY**, a popular name for one or more species of cherry distinguished by their astringency.

**CHOKE-DAMP**, or **AFTER-DAMP**, the name given to the irrespirable gas (carbonic acid) found in coal-mines after an explosion of fire-damp or light carburetted hydrogen.

**CHOLAGOGUE** (kō'la-gōg), a medicine which has the property of carrying off bile.

**CHOLERA** (kol'è-ra), an acute contagious and very fatal disease. In its

more ordinary form it commences with sickness, vomiting, or perhaps two or three loose evacuations of the bowels; after which follow a sense of burning at the præcordia, an increased purging and vomiting of a white or colorless fluid, great prostration of strength, spasms at the extremities, which increase in violence with the vomiting and purging. Such cases may last from twelve to thirty-six hours; after this the patient generally sinks into a state of extreme collapse, and this stage in most cases passes by a gradual transition into a febrile one, which in a majority of instances proves fatal. Sometimes the patient is suddenly stricken down and dies, collapsed within a few hours without diarrhæa or vomiting. This disease is endemic in certain parts of Asia (hence it is sometimes called Asiatic cholera), and is liable to spread to other parts of the world, usually by the ordinary channels of commercial intercourse. It first appeared in Europe in 1829, and reached Britain in 1831, spreading thence to America. Western Europe was again visited by it in 1847, 1853, 1865, 1873, 1875, and in 1885. In 1892 Russia and western Europe suffered severely.

The primary and essential element in the production of cholera has been ascertained to be a constituent of the excreta of cholera patients. Whether this particular substance is the germ of a fungus or other form of minute life is not quite certain, but that it is an organism capable of propagating itself when it is taken into the alimentary canal in food, impure water, or the like, is beyond a doubt. Dr. Koch asserts that the essential cause is a bacillus, having the form of a curved rod, hence called the comma bacillus, and that the disease is caused by the multiplication of this organism in the small intestines. The fact that great numbers are present in persons suffering from cholera is generally admitted, but it is doubted by other experts if they do actually produce the disease. A method of protective inoculation against cholera has been lately tried in Spain, but with small success. The contagion of cholera is not so likely to be conveyed by personal intercourse as by residence in an infected district. Sanitary measures have proved to be the only efficacious means of arresting an epidemic; insanitary conditions decidedly favor it.



Chopines.

**CHOPIN** (sho-pan), Frédéric François, pianist and musical composer, of French extraction, was born at Warsaw in 1810, went to Paris in 1831 on account of the political troubles of Poland, and died



there in 1849. He wrote numerous pieces for the pianoforte, chiefly in the form of nocturnes, polonaises, waltzes, and mazurkas; all of which display much poetic fancy, abounding in subtle ideas with graceful harmonic effects.

**CHOPINE** (chop-ên'), a very high shoe or elevated clog, introduced into England from Venice, in the reign of Queen Elizabeth, and which became the fashionable wear of court ladies during that reign. They were made of wood covered with leather of sundry colors, white, red, yellow, and sometimes gilt. Some of them were of great height, as much as 18 inches, the height of the chopine being seemingly regarded as a mark of the rank of the wearer.

**CHOP-STICKS**, the Chinese substitute for our knife, fork, and spoon at meals, consisting of two smooth sticks of bamboo, wood, or ivory, which are used for conveying meat to the mouth with wonderful dexterity.

**CHORAL SERVICE**, in the Church of England, service with intoned responses, and the use of music throughout wherever it is authorized. The service is said to be partly choral when only canticles, hymns, etc., are sung; wholly choral, when, in addition to these, the versicles, responses, etc., are sung.

**CHORD** (kord), in music, the simultaneous combination of different sounds, consonant or dissonant. The common chord consists of a fundamental or bass note with its third and fifth. When the interval between the bass note and its third is two full tones the combination is a major chord; when the interval is a tone and a half the combination is termed a minor chord; when the intervals between the bass note and its third and the third and the fifth are each a tone and a half, the chord is called diminished. The tonic chord is made up of the key-note and its third and fifth; the dominant chord, consists of the dominant or fifth of the scale accompanied by its third and fifth; the subdominant chord has for its root or bass the subdominant or fourth of the scale, accompanied with its third and fifth.—In geom. a chord is a straight line drawn, or supposed to extend, from one end of an arc of a circle to the other.

**CHOROID** (kō'-), a term applied in anat. to various textures; as the choroid membrane, one of the membranes of the eye, of a very dark color, situated between the sclerotic and the retina, and terminating anteriorly at the great circumference of the iris.

**CHORUS** (kō'rus), originally an ancient Greek term for a troop of singers and dancers, intended to heighten the pomp and solemnity of festivals. During the most flourishing period of ancient tragedy (B.C. 500-400) the Greek chorus was a troop of males and females, who, during the whole representation, were spectators of the action, never quitting the stage. In the intervals of the action the chorus chanted songs, which related to the subject of the performance. Sometimes it even took part in the performance, by observations on the conduct of the personages, by advice, consolation, exhortation, or dissuasion. In the beginning it consisted of a great number of persons, sometimes as many

as fifty; but the number was afterward limited to fifteen. In music, the chorus is that part of a composite vocal performance which is executed by the whole body of the singers, in contradistinction to the solo airs, and concerted pieces for selected voices. The singers who join in the chorus are also called the chorus. The term is also applied to the verses of a song in which the company join the singer, or the union of a company with a singer in repeating certain couplets or verses at certain periods in a song.

**CHOTA NAGPORE**, a division of British India, presidency Bengal. Total area, 43,020 sq. miles. Pop. 4,645,590.

**CHOW-CHOW**, a kind of mixed pickles put up in mustard. It originated in India.

**CHOW CHOW**, a Chinese dog, marked by the possession of a black tongue. It was introduced into the U. States in 1901.

**CHOWDER**, a dish consisting of a mixture of fish or clams, potatoes, biscuit, vegetables and other ingredients. The word and dish are of French origin.

**CHRIST**, a title of our Savior, now used almost as a name or part of his name. See Christianity and Jesus Christ.

**CHRISTENING**, the ceremony at which a person or thing is given a name. In former times it was generally accompanied by baptism at which time the person baptized was believed to become a Christian, as previous to baptism the individual was still a pagan. The ceremony of christening a ship was first practiced in 1418. Nowadays ships are always christened by a woman, preferably young, who breaks a bottle of champagne on the prow as the vessel is launched from the ways.

**CHRISTIAN**, the name of nine Danish kings. Christian II., King of Denmark, Norway, and Sweden, was born 1480, died 1559. He attained the throne in 1513, and in 1518 usurped the throne of Sweden, from which he was expelled by Gustavus Vasa in 1522. He was deposed by his Danish subjects in 1523, and retired to the Netherlands, whence he returned in 1531 with an army, but was defeated, and kept in confinement till his death.—Christian IV., King of Denmark, son of Frederick II. and the Princess Sophia of Mecklenburg, born in Zealand in 1577, succeeded to the throne as a minor in 1588, and died 1648. In the Thirty Years' war he was beaten by Tilly at Lutter in 1626, but afterward, in conjunction with Gustavus Adolphus, obtained the Treaty of Lübeck, 1629. He has the merit of having laid the foundation of the Danish navy, extended the trade of his subjects to the East Indies, and fitted out several expeditions for the discovery of a north-west passage. Christian IX died 1906.

**CHRISTIAN BROTHERS COLLEGE**, a school at St. Louis founded by the Brothers of the Christian Schools (Roman Catholic) in 1855, and having a regular college curriculum of arts and sciences. It has about 450 students, and income of \$30,000.

**CHRISTIAN CATHOLIC CHURCH**, the name given by John Alexander Dowie to a denomination founded by him in 1890 at Chicago. The faith was

based on the belief that miraculous healing is possible. Dowie removed his organization to Zion City, near Chicago, a town built by the Zionites and governed by them, since 1902. In late years Dowie claimed to be Elijah, reincarnated. His followers revolted in 1905 and his place was taken by Voliva, a subordinate. The management of the business of Zion is now in the hands of a receiver.

**CHRISTIAN ENDEAVOR, YOUNG PEOPLE'S SOCIETY OF**, a society founded in 1881 by Francis E. Clark of the Methodist Episcopal church. It grew with great rapidity and recently had a membership of upward of 3,000,000. The object of the society is to cultivate religious activity in simple things of daily life.

**CHRISTIAN ERA**; the great era now almost universally employed in Christian countries for the computation of time. It is generally supposed to begin with the year of the birth of Christ; but that event seems to have taken place four years before the present established beginning of the era. Time before Christ is marked B.C., after Christ A.D. The era is computed from the 1st Jan. in the fourth year of the 194th olympiad, and the 753d year from the building of Rome. It was first used by Dionysius, a Syrian monk, in the 6th century, but did not become general until about the middle of the 15th century.

**CHRISTIANIA**, a city and port, the capital of Norway, province Aggershuus



or Christiania, at the head of the long narrow inlet called Christiania Fjord, about 60 miles from the open sea or Skagerrack. Important public buildings are the royal palace, the house of representatives or Storting, the governor's palace, and the cathedral. Attached to the university—the only one in Norway, opened in 1813—is a museum, containing a fine collection of antiquities. The manufactures of the city consist of woollen cloth, ironware, tobacco, paper, leather, soap, spirits, glass, etc., and there are extensive breweries. The exports are principally timber and iron. The environs are exceedingly beautiful. Pop. 225,686.

**CHRISTIANITY**, the religion instituted by Jesus Christ. Though the



great moral principles which it reveals and teaches, and the main doctrines of the gospel, have been preserved without interruption, the genius of the different nations and ages have materially colored its character. The first community of the followers of Jesus was formed at Jerusalem soon after the death of their Master. Another at Antioch in Syria first assumed (about 65) the name of Christians; and the travels of the apostles spread Christianity through the provinces of the Roman Empire. Palestine, Syria, Asia Minor, Greece, the islands of the Mediterranean, Italy, and the northern coast of Africa, as early as the 1st century, contained societies of Christians. At the end of the 3d century almost one-half of the inhabitants of the Roman Empire, and of several neighboring countries, professed this belief. While Christianity as a system was thus spreading, many heretical branches had sprung from the main trunk. From the Gnostics, who date from the days of the apostles, to the Nestorians of the 5th century the number of sects was large, and some of them exist to the present day. The most important events in the subsequent history of Christianity are the separation of the Eastern and Western Churches early in the 8th century; and the Western reformation, which may be said to have commenced with the sectaries of the 13th century and ended with the establishment of Protestantism in the 16th. The number of Christians now in the world is computed at 450,000,000. Of these about 212,000,000 are Roman Catholics, 83,000,000 belong to the Greek Church, and 155,000,000 are Protestants. Of the various sects of Protestants the most numerous are the Lutheran, the Calvinistic, and the Anglican Church.

**CHRISTIAN KNOWLEDGE**, Society for Promoting, a society founded in London in 1698, in connection with the Church of England, having for its main objects the establishment of churches, schools, and libraries, and the publication and circulation of religious and moral literature. It is still in active operation, publishes a great number of religious and instructive works, and recently established a training college for schoolmistresses.

**CHRISTIANS**, the general name of the followers of Christ. See Christianity.

**CHRISTIANS**, or Christian Connection, the name of a denomination in the United States and Canada, adopted to express their renunciation of all sectarianism. They are to be met with in all parts of the country, the number of their churches being estimated at over 1000. Each church is an independent body; the Scriptures are their only rule of faith, and admission to the church is obtained by a simple profession of belief in Christianity. As a rule they are anti-Trinitarians and Baptists.

**CHRISTIAN SCIENCE**, a religious-scientific discovery claimed by Mrs. Mary Baker Eddy of Concord, N. H., to have been made by her in 1866. Christian Science purports to reveal the science of God, also the science of life and of man. It claims to be the science

of the divine Mind or Omniscience. It affirms the divine individuality of God, and denies all man-made conceptions of Him as a finite personality. It declares that God can only be spiritually discerned, and that the material senses cannot cognize or comprehend God. Mrs. Eddy adds to the accepted synonyms for Deity such as Life, Truth, Love and Spirit, that God is the Divine Principle of all true being; the creative principle, the cause, origin, source, basis, foundation, government and law of all that has actual and permanent existence. She repudiates all assumption that God has created or consented to any form of evil, sin, sickness or death. She declares that all of God's laws mean and provide for life, and life only.

It denies the personality of evil as devil, and avers that evil has no real entity or immortality. Sin or evil is a negation—a wrong sense of the truth of being—a wrong sense of that which is eternally right. It asserts that the primary cause of sickness is to be found in the mental realm. It declares that fear, sin, superstition and ignorance have involved the human race in mortality, and that when the world fully learns this fact, it will begin to scientifically cope with, and permanently master disease.

Christian Scientists believe in God, in the inspiration of the Scriptures, in the divinity of Christ, in the supremacy of God as Spirit, in prayer without ceasing, and in all the essentials of Christianity, and claim that the prime office of Christian Science is to destroy evil and reform mankind. They believe that all evil will eventually be destroyed and become extinct.

**CHRISTINA**, Queen of Sweden, daughter of Gustavus Adolphus, born 1626, died 1689. After the death of Gustavus, at Lützen, in 1632, the states-general appointed guardians to the Queen Christina, then but six years old. In 1644 she took upon herself the government. A great talent for business, and great firmness of purpose, distinguished her first steps. She terminated the war with Denmark begun in 1644, and obtained several provinces by the treaty concluded at Bromsebro in 1645. In 1654 she abdicated in favor of her cousin Charles Gustavus, reserving to herself a certain income, entire independence, and full power over her suite and household. She left an immense art collection and a large number of valuable MSS. Her writings were collected and published in 1752.

**CHRISTMAS** (kris'mas), the festival of the Christian church observed annually on 25th December in memory of the birth of Christ, and celebrated by a particular church service. The time when the festival was first observed is not known with certainty; but it is spoken of in the beginning of the 3d century by Clement of Alexandria, and in the latter part of the 4th century Chrysostom speaks of it as of great antiquity. As to the day on which it was celebrated, there was long considerable diversity, but by the time of Chrysostom the Western Church had fixed on the 25th of December, though no certain knowledge of the day of

Christ's birth existed. The Eastern Church, which previously had generally favored the 6th of January, gradually adopted the same date. Many believe that the existence of heathen festivals celebrated on or about this day had great influence on its being selected; and the Brumalia, a Roman festival held at the winter solstice, when the sun is as it were born anew, has often been instanced as having a strong bearing on the question.

**CHRISTMAS-BOXES**, boxes in which presents were deposited at Christmas; hence a Christmas gift. The custom of bestowing Christmas boxes arose in the early days of the church, when boxes were placed in the churches for the reception of offerings; these boxes were opened on Christmas day, and their contents distributed by the priests on the morrow (boxing-day).

**CHRISTMAS CARDS**, ornamental cards containing words of Christmas greeting to friends to whom they are sent. The first of them appeared about 1862, and consisted of pictures of robins, holly, etc.; since then highly artistic designs have been introduced, and their manufacture has become a considerable industry in Germany, France and England. Immense quantities of them pass through the post-office every Christmas.

**CHRISTMAS CAROL**, a carol or song descriptive of the birth of Christ, or of incidents connected with it, sung especially at Christmas.

**CHRISTMAS ROSE**, the black hellebore, so called from its flower, which resembles a large white single rose; its foliage is dark and evergreen, and the plant blossoms during the winter months.

**CHRISTMAS TREE**, a small fir-tree lighted up by means of tiny small candles of colored wax or small Chinese lanterns, ornamented with flags, tinsel ornaments, etc., and hung all over with gifts for children.

**CHRISTOLOGY**, that branch of the study of divinity which deals directly with the doctrine of the person of Christ.

**CHRISTOPHE** (kris-tof), Henri, King of Hayti, was born in the West Indies in 1767, and was employed as a slave in St. Domingo on the outbreak of the blacks against the French in 1793. From the commencement of the troubles he signalized himself by his energy, boldness, and activity in many bloody engagements. In 1811 he had himself proclaimed King of Hayti by the name of Henri I. His cruelty provoked a revolt, which being unable to quell he shot himself, 1820.

**CHRISTOPHER'S**, St. (commonly called St. Kitt's), a British island in the West Indies, one of the Leeward Islands, 23 miles in length, and in general about 5 in breadth; area 68 sq. miles, or 44,000 acres, of which about 17,000 acres are appropriated to the growth of sugar, and 4000 to pasturage. It was discovered by Columbus in 1493 and colonized by the English in 1623. Pop. 29,782.

**CHRISTY**, Howard Chandler, an American illustrator, born in Ohio in



1873. In 1893 he began his career as a magazine illustrator and in 1901 drew the pictures with which Winston Churchill's *Crisis* is illustrated.

**CHROMATE.** See Chrome Iron Ore, Chrome Yellow.

**CHROMATIC PRINTING.** See Color Printing.

**CHROMATICS,** the science of colors; that part of optics which treats of the properties of the colors of light and of natural bodies.

**CHRO'MIUM,** a metal which forms very hard steel-gray masses; it never occurs native, but may be obtained by reducing the oxide. In its highest degree of oxidation it forms a compound of a ruby-red color. By itself it has received no practical applications. It takes its name from the various and beautiful colors which its oxide and acid communicate to minerals into whose composition they enter. It is the coloring matter of the emerald and beryl. Chromium is employed to give a fine deep green to the enamel of porcelain, glass, etc. The oxide of chromium is of a bright grass-green or pale-yellow color. This element was originally discovered in 1797 by Vauquelin, in the native chromate of lead of Siberia. See preceding articles.

**CHROMO-LITHOGRAPHY,** a method of producing a colored or tinted lithographic picture, by using various stones having different portions of the picture drawn upon them with inks of various colors and so arranged as to blend into a complete picture. Sometimes as many as twenty different colors are employed. In printing, the lighter shades are printed off first and the darkest last.

**CHRO'MOSPHERE,** the name given to the gaseous envelope which exists round the body of the sun, through which the light of the photosphere, an inner envelope of incandescent matter, passes. During total eclipses it had been observed that a red-colored envelope surrounded the sun, shooting up to great distances from the surface. It seems to have been first recognized by Secchi; and the projecting portions of it are commonly described as "red-colored protuberances" and "red flames." To this red envelope the name chromosphere was given by Mr. Lockyer. The light from it is much fainter than that from the photosphere; and till 1868, when M. Janssen and Mr. Lockyer almost simultaneously pointed out a method of viewing it, it was never seen except during eclipses. The chromosphere and its prominences, when examined with the telespectroscope, exhibit a spectrum of bright lines due to incandescent gases. The most elevated portions consist entirely or almost entirely of hydrogen, the lightest of the gases. Lower down are found the gases or vapors of the heavier metals—of sodium, magnesium, barium, iron, and others. The lower the layer of the chromosphere examined the more densely is the spectrum filled with lines of metals, and in the prominences the red hydrogen flames tower high above all.

**CHRONIC,** a term applied to diseases which are inveterate or of long con-

tinuance, in distinction to acute diseases, which speedily terminate.

**CHRONICLES,** Books of, two books of the Old Testament which formed only one book in the Hebrew canon, in which it is placed last. The name Chronicles was given to it by Jerome. The book is one of the latest compositions of the Old Testament, and is supposed to have been written by the same hand as Ezra and Nehemiah. According to its contents the book forms three great parts:—1, genealogical tables; 2, the history of the reigns of David and Solomon; 3, the history of the kingdom of Judah from the separation under Rehoboam to the Babylonian captivity, with a notice in the last two verses of the permission granted by Cyrus to the exiles to return home and rebuild their temple. The Chronicles present many points of contact with the earlier scriptures, historical and prophetic, more especially, however, with the books of Samuel and of Kings.

**CHRON'OGRAPH,** the name given to various devices for measuring and registering very minute portions of time with extreme precision. Benson's chronograph is, in principle, a lever watch with a double seconds hand, the one superimposed on the other. The outer end of the lowermost hand has a small cup filled with a black viscid fluid, with a minute hole at the bottom, while the corresponding end of the uppermost is bent down so as just to reach the hole. At the starting (say) of a horse-race, the observer pulls a string, whereupon the bent end of the upper hand passes through the hole and makes a black mark on the dial, instantly rebounding. Again, as each horse passes the winning-post the string is redrawn and a dot made, and thus the time occupied by each horse is noted. This chronograph registers to one-tenth of a second. Strange's chronograph is connected with the pendulum of an astronomical clock, which makes a mark on a sheet of paper at the beginning and end of each swing. By touching a spring on the appearance (say) of a particular star in the field of a telescope, an additional dot is made intermediate between the two extreme ones, and by measuring the distance of this from either of these extremes the exact time can be ascertained to one-hundredth of a second. Schultze's chronograph, in which electricity is applied, is yet far more precise, registering time to the five-hundred-thousandth part of a second.

**CHRONOL'OGY,** the science which treats of time, and has for its object the arrangement and exhibition of historical events in order of time and the ascertaining of the intervals between them. Its basis is necessarily the method of measuring or computing time by regular divisions or periods, according to the revolutions of the earth or moon. The motions of these bodies produce the natural division of time into years, months, and days. As there can be no exact computation of time or placing of events without a fixed point from which to start, dates are fixed from an arbitrary point or epoch, which forms the beginning of an era. The more im-

portant of these are the creation of the world among the Jews; the birth of Christ among Christians; the Olympiads among the Greeks; the building of Rome among the Romans; the Hejira or flight of Mohammed among the Mohammedans, etc. See *Epoch*, *Calendar*.

**CHRONOM'ETER,** any instrument that measures time, as a clock, watch, or dial; but, specifically, this term is applied to those time-keepers which are used for determining the longitude at sea, or for any other purpose where an accurate measure of time is required, with great portability in the instrument. The chronometer differs from the ordinary watch in the principle of its escapement, which is so constructed that the balance is free from the wheels during the greater part of its vibration, and also in being fitted with a "compensation adjustment," calculated to prevent the expansion and contraction of the metal by the action of heat and cold from affecting its movements. Marine chronometers generally beat half-seconds, and are hung in gimbals in boxes 6 or 8 inches square. The pocket chronometer does not differ in appearance from a watch except that it is somewhat larger.

**CHRON'OSCOPE,** an instrument for measuring the duration of extremely short-lived phenomena, such as the electric spark; more especially the name given to instruments of various forms for measuring the velocity of projectiles.

**CHRY'S'ALIS,** a form which butterflies, moths, and most other insects assume when they change from the state of larva or caterpillar and before they arrive at their winged or perfect state. In the chrysalis form the animal is in a state of rest or insensibility, and exists without nutriment, the length of time varying with the species and season. During this period an elaboration is going on in the interior of the chrysalis, giving to the organs of the future animal their proper development.

**CHRY'SANTHEMUM,** a large genus of composite plants, consisting of herbs or shrubs with single, large-stalked yellow flowers or with many small flowers; the rays are sometimes white.

**CHRY'SOSTOM,** John, St., a celebrated Greek father of the church, born in Antioch about A.D. 344, died at Comana in Pontus 407.

**CHUB,** a fish of the genus carps. The body is oblong, nearly round; the head and back green, the sides silvery, and the belly white. It frequents deep



Chub.

holes in rivers shaded by trees, but in warm weather floats near the surface, and furnishes sport for anglers. It is indifferent food, and rarely attains the weight of 5 lbs.

**CHUQUISACA** (chō-kē-sā'ká), or **SUCRE**, a city of S. America, the capital of Bolivia; well situated on a plateau between the Amazon and La Plata



rivers, 9343 feet above sea-level. It has a cathedral and a university. It was founded by one of Pizarro's officers in 1539. Pop. estimated at about 25,000.—The province of Chuquisaca has an area of 72,000 sq. miles; pop. 200,000.

**CHURCH**, a word which in its widest sense denotes the whole community of Christians, and was thus used by the New Testament writers. In more restricted significations it denotes a particular section of the Christian community differing in doctrinal matters from the remainder, as the Roman Catholic Church, the Protestant Church, etc.; or to designate the recognized leading church of a nation, as the English, Scotch, or French Church. Generally speaking any building set apart for religious ordinances is called a church, though when of a minor kind it is usually designated a chapel.

**CHURCH CALENDAR**, a table of the holy days, feasts, and fasts of a church. It originated in 448 A.D. and has been retained by the Roman Catholic, the Lutheran, and the Protestant Episcopal churches.

**CHURCH, FATHERS OF THE**, teachers and writers of the ancient church who flourished after the time of the apostles and apostolic fathers (the immediate disciples of the apostles), from the 2nd to the 6th century. The most celebrated among the Greek fathers are Clement of Alexandria, Origen, Eusebius, Athanasius, and Chrysostom. The most distinguished among the Latin fathers are Tertullian, Augustine, Ambrose and Jerome.

**CHURCH**, Frederick Edwin, an American painter, born in 1826 at Hartford, Conn., died 1900. He painted N. and S. American mountains and American landscapes in general. His best known picture is his Horseshoe Falls, Niagara.

**CHURCH**, States of the. See Papal States.

**CHURCHILL**, Randolph Henry Spencer, Lord, second son of the sixth Duke of Marlborough, born 1849. Having entered parliament in 1874, by 1884 he had risen to the position of a recognized leader of the Conservative party, and in 1885 became Indian secretary in Lord Salisbury's government. On the defeat of Gladstone's Irish Bill in 1886 Churchill became leader of the House of Commons and Chancellor of the Exchequer, posts which he unexpectedly resigned in December, 1886. He died in 1895.

**CHURCH OF GOD**, a religious denomination of the U. States, the doctrines of which are substantially those of the Baptist church. It originated with the revival work of John Winebrener, in 1830, at Harrisburg, Pa. There are about 500 ministers, 580 churches, and 40,000 communicants. The denomination has a college at Findlay, Ohio, and does considerable missionary work.

**CHURCH TRIUMPHANT**, an organization founded by George Schweinfurth in 1883, and centered at Rockford, Ill. Schweinfurth claimed that he was another incarnation of Christ. The church has about 400 members.

**CHURCH WARDENS**, officials of the Protestant Episcopal Church elected

for the purpose of caring for the church property. In the U. States they are generally two and are elected annually.

**CHURN**, a vessel for preparing butter from cream or milk, in which cream is agitated to separate its buttery globules in a solid mass from the fluid portions.

**CIBBER**, Colley, a dramatic writer and actor, born in London 1671, died 1757. He took to the stage in 1689. His first dramatic effort, *Love's Last Shift*, appeared in 1695; and it was followed by *Woman's Wit*, the *Careless Husband*, and the *Non-juror*, of which the *Hypocrite* of the modern stage is a new version. A court pension and the appointment of poet-laureate drew upon him the rancor of the wits and poets of the day, including Pope. He is author of about twenty-five dramas, the amusing *Apology for the Life of Colley Cibber*, etc.

**CICERO**, Marcus Tullius, the greatest Roman orator, was born 106 B.C. at Arpinum. He received the best education available, studied philosophy and law, became familiar with Greek literature, and acquired some military knowl-



Cicero—Antique bust.

edge from serving a campaign in the Marsic war. At the age of twenty-five he came forward as a pleader, and having undertaken the defense of Sextus Roscius, who was accused of parricide, procured his acquittal. In B.C. 76 he was appointed quaestor of Sicily, and behaved with such justice that the Sicilians gratefully remembered him and requested that he would conduct their suit against their governor Verres. After this suit Cicero was elected to the office of aedile, B.C. 70, became praetor in 67, and consul in 63. It was now that he succeeded in defeating the conspiracy of Catiline, after whose fall he received greater honors than had ever before been bestowed upon a Roman citizen. But Cicero's fortune had now reached the culminating point, and soon was to decline. The Catilinarian conspirators who had been executed had not been sentenced according to law, and Cicero, as chief magistrate, was responsible for the irregularity. Publius Clodius, the tribune of the people, raised such a storm against him that he was obliged to go into exile (B.C. 58). On the fall of the Clodian faction he was recalled to Rome, but he never succeeded in regaining the

influence he had once possessed. In B.C. 52 he became proconsul of Cilicia, a province which he administered with eminent success. As soon as his term of office had expired he returned to Rome (Jan. B.C. 49), which was threatened with serious disturbances owing to the rupture between Caesar and Pompey. He espoused the cause of Pompey, but after the battle of Pharsalia he made his peace with Caesar, with whom he continued to all appearance friendly, and by whom he was kindly treated, until the assassination of the latter (44 B.C.). Antony having taken Caesar's place, Cicero composed those admirable orations against him, delivered in B.C. 43, which are known to us by the name of *Philippics* (after the speeches of Demosthenes against Philip of Macedon). He died in his sixty-fourth year, B.C. 43. Cicero's eloquence has always remained a model. After the revival of learning he was the most admired of the ancient writers; and the purity and elegance of his style will always place him in the first rank of Roman classics. His works, which are very numerous, consist of orations; philosophical, rhetorical, and moral treatises; and letters to Atticus and other friends.

**CID**, an epithet applied to Ruy or Roderigo Diaz, Count of Bivar (born 1026, died 1099), the national hero of Spain. He signalized himself by his exploits in the reigns of Ferdinand, Sancho, and Alphonso VI. of Leon and Castile; but the facts of his career have been so mixed with glorifying myths that it is scarcely possible to separate them. His life, however, appears to have been entirely spent in fierce warfare with the Moors, then masters of a great part of Spain. His exploits are set forth in a special chronicle, and in a Castilian poem, probably composed about the end of the 12th century. The story of his love for Ximena is the subject of *Le Cid* of Corneille. Whatever chronicles and songs have conveyed to us of the history of the Cid is collected in Southey's *Chronicle of the Cid*.

**CIDER**, a fermented liquor made from the expressed juice of apples. The apples are ground and crushed until they are reduced to a pulp, the juice is allowed to run into casks, where it is freely exposed to the air until fermentation takes place, when a clear liquor of a pale-brown or amber color is the result.

**CIENFUEGOS** (thē-en-fō-ā'gōs), a seaport of Cuba, on the south coast of the island, with a safe and capacious harbor on the bay of Jagua, 130 miles s.e. of Havana, with which (and other towns) it is connected by railway. It is among the finest towns of the island, and exports sugar, wax, timber, etc. During the Spanish-American war it was blockaded by Admiral Schley. Pop. 30,038.

**CIGAR** (si-gār'), a small roll of manufactured tobacco leaves carefully made up, and intended to be smoked by lighting at one end and drawing the smoke through it. The choicest cigars are those made in and imported from Havana. Medicated cigars, or cigars made of some substance having remedial properties, are often used for certain



complaints, as stramonium cigars for asthma. Cheroots are peculiarly-shaped cigars much thicker at one end than the other, and are largely imported from Manilla.

**CIGARETTE** (sig-a-ret'), a sort of small cigar made by rolling fine-cut tobacco in thin paper specially prepared for the purpose.

**CIMON**, an ancient Athenian general and statesman, was a son of the great Miltiades. He fought against the Persians in the battle of Salamis (480 B.C.), and shared with Aristides the chief command of the fleet sent to Asia to deliver the Greek colonies from the Persian yoke. The return of Aristides to Athens soon after left Cimon at the head of the whole naval force of Greece. He died shortly after, in 449, while besieging Citium in Cyprus.

**CINCHONA** (sin-kō'na or sin-chō'na), the trees, shrubs, or herbaceous plants, with simple opposite leaves. They are found almost exclusively in the tropics, and many of the species are of great medicinal importance as tonics, febrifuges, emetics, and purgatives. Among



Cinchona.

their chief products are Peruvian bark, quinine, ipecacuanha, coffee, chay-root, etc. The genus trees seldom exceed 40 or 50 feet in height, with simple, opposite, entire leaves and small flowers, inhabiting chiefly the east side of the Andes of Peru, Bolivia, Ecuador, and Colombia. The valuable Peruvian bark is yielded by various species. From the wasteful method of cutting down the trees to get their bark it was believed that there would soon be a dearth of the valuable medicine, and hence cinchona plants were taken from their native regions and plantations formed in various tropical countries, so that Ceylon, India, Java, etc., are now important sources of Peruvian bark. The bark is taken off in strips longitudinally, and is in time renewed by natural growth.

**CINCINNATI**, the chief city of Ohio, situated on the Ohio river. It is 300 miles from Chicago, 764 miles from New York, and 610 miles from Washington. The city is built on a number of elevations which rise in plateaux from the river and is bounded by a semicircle of hills upon which the fine residences are situated. It has an area of 36 sq. miles and was laid out on a plan similar to that of Philadelphia.

The city was settled in 1788 and the settlement passed through various vicissitudes until 1819 when it was incorporated. Its limits were several times increased. The principal public buildings are the U. States building for post-office, courts, etc., constructed entirely of brick, iron and granite, at a cost of \$5,000,000; the city hall, completed in 1893, a substantial, spacious, and elegant structure costing \$1,500,000; the Music Hall, with a seating capacity of 5,000; the Chamber of Commerce building; the County Court-house; the Cincinnati College; the Ohio and Miami Medical Colleges; the Public Library; the Central Union R. R. dépôt; the Masonic Temple; the Odd Fellows' building; the Scottish Rite Cathedral; the City Hospital, and the Art Museum in Eden Park. Among theaters, the Pike, Grand Opera-house and Walnut Street are very creditable. The Ohio Mechanics' Institute has long been a great educational force in the city. It owns an ample building, with library, lecture-hall, and school-rooms. It maintains courses of lectures specially devoted to the mechanic arts, and a night-school with 700 pupils, where instruction is given in the rudiments of science, mathematics, architecture, and kindred subjects. The principal libraries are the Public Library, with 212,262 books and 33,867 pamphlets; the Young Men's Mercantile, with 50,000 volumes; the Law Library, with 8,000 volumes; the library of the Historical Society, with a large number of rare books, pamphlets, manuscripts, etc.; and the library of the Mechanics' Institute.

The government of the city has much of the so-called "federal" plan. The mayor is elected every three years, and is not eligible for re-election. He appoints a board of review, six members, with authority to examine and supervise city officers and fix rates of taxation; and a board of elections, four members, which appoints all election officers, and conducts the elections and canvasses returns. He also appoints the prosecutor of the police court. He is the chief of police, with powers similar to those belonging to an officer of the army—to discipline and command, but not to appoint or discharge. There is a board of four police commissioners, appointed by the governor of the state. The mayor nominates all officers of the police court, and with the approval of the board appoints them. Police officers hold during "good behavior," and can only be removed or punished upon charges and a hearing by the board. They must pass a medical and a literary examination before appointment. A board of service, chosen by popular vote, consisting of five members, has charge of the streets, waterworks, city infirmary, and parks.

The vigorous growth of railway facilities has apparently reduced the importance of river transportation; figures show an enormous tonnage by river each year. The city is also a railway center, every important railway system having lines passing through it. Its inland situation precludes it from foreign commerce, but its location in the most productive portion of the U.

States, with its ample means of communication, must always make it a most important center of domestic trade.

It is, however, chiefly a manufacturing city. Its industries ran in this direction at an early date. The distance from any source of supply and the convenience of all sorts of materials made manufacturing profitable, and there was a steady and increasing demand from the growing regions lying south and west. Pop. 475,000.

**CINCINNATI MUSICAL FESTIVAL**, a musical feast originated by Theodore Thomas in 1873, held every two years, comprehending seven concerts. The Chicago orchestra furnishes the music and a local chorus of 500 assists.

**CINCINNATI, SOCIETY OF THE**, a patriotic society to perpetuate the traditions of the American revolutionary war. Its members consist of lineal descendants of officers who fought in that war and membership is restricted to the eldest male descendants of such officers. The society was organized in 1783 at Fishkill, N. Y., and the name was adopted from that of the Roman patriot Cincinnatus (which see). There are at present about 860 members, organized into 13 state societies.

**CINCINNATI, UNIVERSITY OF**, founded in 1858 by Charles McMicken, and subsequently enlarged by appropriations set apart by the city of Cincinnati. The university has a law and a medical school, an academic apartment, a college of engineering, a college of dentistry, and a pathological school. It has a fund of \$3,500,000, 164 instructors, 1100 students, and a library of 68,000 volumes.

**CINCINNA'TUS**, Lucius Quinctius, a wealthy patrician in the early days of the Roman Republic, born about 519 B.C. After violently opposing the passage of the Terentilian law for the equalization at law of patricians and plebians, he succeeded Publicola in the consulship, and then retired to cultivate his small estate beyond the Tiber. Here, when Minucius was surrounded by the Æquians, the messengers of the senate found him at work when they came to summon him to the dictatorship. He rescued the army from its peril, marched to Rome laden with spoil, and then returned quietly to his farm. At the age of eighty he was again appointed dictator to oppose the ambitious designs of Spurius Maelius.

**CINNA**, Lucius Cornelius, an eminent Roman, an adherent of Marius, who, obtaining the consulship B.C. 87, along with Cneius Octavius, impeached Sulla and endeavored to secure the recall of Marius. Being driven from the city by Octavius, he raised the Italian cities, and invested Rome while Marius blockaded it from the sea. On its capture the friends of Sulla were massacred, and Cinna and Marius made themselves consuls (B.C. 86); but after the death of Marius the army refused to follow Cinna against Sulla, and put him to death in B.C. 84.

**CIN'NABAR**, red sulphide of mercury, the principal ore from which that metal is obtained, occurring abundantly in Spain, California, China, etc. It is of a cochineal-red color, and is used as a



pigment under the name of vermilion.

**CINNAMON**, the bark of the under branches of a species of laurel, which is chiefly found in Ceylon, but grows also in Malabar and other parts of the East Indies. The tree attains the height of 20 or 30 feet, has oval leaves, pale-yellow



Cinnamon.

flowers, and acorn-shaped fruit. The Ceylonese bark their trees in April and November, the bark curling up into rolls or quills in the process of drying; the smaller quills being introduced into the larger ones. These are then assorted according to quality by tasters, and made up into bundles.

**CIPHERS**, signs used to represent numbers, whether borrowed signs, or letters, with which the Greeks designated their numbers, or peculiar characters, as the modern or Arabic ones. The ciphers, such as they are at present 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, did not come in common European use until the 11th century. For cipher as applied to methods of secret writing see Cryptography.

**CIRCAS'SIA**, or **TCHERKESSIA**, a mountainous region in the southeast of European Russia, lying chiefly on the



Circassians—From Hommaire de Hell.

north slope of the Caucasus, partly also on the south, and bounded on the west by the Black Sea, and now forming part of the government of the Caucasus. The mountains, of which the culminating heights are those of Mount Elbruz, are intersected everywhere with

steep ravines and clothed with thick forests, and the territory is principally drained by the Kuban and its tributaries. Its climate is temperate, its inhabitants healthy and long-lived. They are divided into several tribes speaking widely-different dialects. While they retained their independence their government was of a patriarchal character, but every free Circassian had the right of expressing his opinion in the assemblies. They possessed none but traditional annals and laws. Polygamy was permissible in theory, but not common. The duties of hospitality and vengeance were alike binding, and a Spartan morality existed in the matter of theft. Their religion, which is nominally Moslem, is in many cases a jumble of Christian, Jewish, and heathen traditions and ceremonies. As a race the Circassians are comely, the men being prized by the Russians as warriors, and the women by the Turks as mistresses, a position generally desired by the women themselves. The early history of Circassia is obscure. Between the 10th and 13th centuries it formed a portion of the empire of Georgia, but in 1424 the Circassians were an independent people, and at war with the Tartars of the Crimea, etc., to whose khans, however, some were occasionally tributary. In 1705 the Tartars were defeated in a decisive battle, but shortly after the territorial encroachments of the Russians on the Caucasian regions began, and in 1829 the country was formally annexed by them. The Circassians, properly so called, have been estimated to number from 500,000 to 600,000.

**CIRCE** (sēr-sē), a fabled sorceress of Greek mythology, who lived in the Island of *Ææa*, represented by Homer as having converted the companions of Ulysses into swine after causing them to partake of an enchanted beverage. Ulysses under the guidance of Hermes compelled her to restore his companions, and afterward had two sons by her.

**CIRCLE** is a plane figure contained by one line, which is called the circumference, and is such that all straight lines drawn from a certain point (the center) within the figure to the circumference are equal to one another. The properties of the circle are investigated in books on geometry and trigonometry. Properly the curve belongs to the class of conic sections, and is a curve of the second order. A great circle of a sphere is one that has its center coinciding with that of the sphere. The celebrated problem of "squaring the circle," is to find a square whose area shall be equal to the area of any given circle. It is not possible to do so. All that can be done is to express approximately the ratio of the length of the circumference of the circle to the diameter, and to deduce the area of the figure from this approximation.

**CIRCUIT**, a division of a country, or a county, or a state, in which the same judges hold court for the trial of facts. In the United States, the federal judiciary sits in nine circuits comprising the whole territory of the United States, and the federal judges move about in these circuits holding court in different parts thereof. In certain states, also

there are a number of circuits. In Britain a certain number of counties form a circuit, and the time of court is called assizes.

**CIRCULATION**, in an organism, the flowing of sap or blood through the veins or channels, by means of which the perpetual and simultaneous movements of composition and decomposition manifested in organic life are carried on. Although Galen, who had observed the opposite directions of the blood in the arteries and veins, may be said to have been upon the very point of discovering the circulation, the discovery was reserved for William Harvey, who in 1628 pointed out the continuity of the connections between the heart, arteries, and veins, the reverse directions taken by the blood in the different vessels, the arrangements of valves in the heart and veins so that the blood could flow only in one direction, and the necessity of the return of a large proportion of blood to the heart to maintain the supply. In 1661 Malpighi exhibited microscopically the circulation in the web of a frog's foot, and showed that the blood passed from arteries to veins by capillaries or intermediate vessels. This finally established the theory with regard to animals, but the movements of sap in vegetables were only traced with difficulty and after numerous experiments. Many physiologists indeed are still disposed to refuse the term "circulation" to this portion of the economy of plants; but though sap, unlike the blood, does not exhibit movements in determinate vessels to and from a common center, a definite course is observable. In the stem of a dicotyledonous tree, for example, the sap describes a sort of circle, passing upward from the roots through the newer woody tissue to the leaves, where it is elaborated under the action of air and light; and thence descending through the bark toward the root, where what remains of it is either excreted or mixed with the new fluid, entering from the soil for a new period of circulation.

**CIRCUMCISION**, a rite common among the Semites, though by no means peculiar to them, and possibly derived by them from the Egyptians or from some non-Semitic source. At any rate the antiquity of its institution in Egypt is fully established by the monuments, which make it evident that it was practiced at a period very much earlier than the Exodus. It was, however, a primitive Arab custom, and its practice among the Jews may with equal probability be assigned to an Arab source. Whatever its origin, the rite is confined to no single race. It was practiced by the Aztecs and other peoples of Central America, and is still to be found among tribes on the Amazon, among the Australian tribes, the Papuans, the inhabitants of New Caledonia, and those of the New Hebrides. In Africa it is common among the Kaffirs and other tribes widely removed from Semitic influence. It is practised also by the Abyssinian Christians, and although not enjoined in the Koran has been adopted by the Mahometans on the example of Mahomet himself. It was possibly in its origin a sacrifice to the deity pre-



siding over generation, though in certain nations the rite has acquired a new symbolic significance according to the stage of their spiritual development.

**CIRCUMNAVIGATORS**, a term usually applied to the early navigators who sailed round the globe. Magellan, a Portuguese in the service of Spain headed the first expedition which succeeded in circumnavigating the globe, though he did not live to complete the voyage.

**CIRCUMSTANTIAL EVIDENCE.** See Evidence.

**CIRCUMVALLATION**, or **LINE OF CIRCUMVALLATION**, in military affairs, a line of field-works consisting of a rampart or parapet, with a trench surrounding a besieged place, or the camp of a besieging army.

**CIR'CUS**, among the Romans, a nearly oblong building without a roof, in which public chariot-races and exhibitions of pugilism and wrestling, etc., took place. The largest of these buildings in Rome was the Circus Maximus, capable, according to Pliny, of containing 260,000, and according to Aurelius Victor, 385,000 spectators. The games celebrated in these structures were known collectively by the name of *ludi circenses*, circensian games, or games of the circus, which under the emperors attained the greatest magnificence. The passion of the common or poorer class of people for these shows appears from the cry with which they addressed their rulers—*panem et circenses* (bread and the games!). The festival was opened by a splendid procession, or *pompa*, in which the magistrates, senate, priests, augurs, vestal virgins, and athletes, took part, carrying with them the images of the great gods, the Sibylline books, and sometimes the spoils of war. On reaching the circus the procession went round once in a circle, the sacrifices were performed, the spectators took their places, and the games commenced. These were: 1. Races with horses and chariots, in which men of the highest rank engaged. 2. The gymnastic contests. 3. The Trojan games, prize contests on horseback, revived by Julius Cæsar. 4. The combats with wild beasts or with men (criminals or volunteers). 5. Representations of naval engagements for which purpose the circus could be laid under water. The expense of these games was often immense. Pompey, in his second consulship, brought forward 500 lions at one combat of wild beasts, which, with eighteen elephants, were slain in five days.

The modern circus is a place where horses are trained to perform antics, and where exhibitions of acrobats and various pageantries, including a large amount of buffoonery, are presented.

**CIRRHO'SIS**, a disease characterized by growth of fibrous tissue which gradually encroaches on and by compression destroys the true structure of the organ attacked. It is very frequent in the liver as a consequence of spirit-drinking; and hence the term "drunkard's liver".

**CISAL'PINE REPUBLIC**, a state set up in 1797 by Napoleon I. in North Italy, recognized by Germany as an independent power at the Peace of

P. E.—18

Campo-Formio. It comprised Austrian Lombardy, together with the Mantuan and the Venetian provinces, Bergamo, Brescia, Crema, Verona, and Rovigo, the duchy of Modena, the principality of Massa and Carrara, Bologna, Ferrara, and Romagna, and latterly its area was 16,337 sq. miles; its pop. 3,500,000. The legislative body held its sessions in Milan. On January 25, 1802, it received the name of the Italian Republic; from 1805 to 1814 it formed part of the kingdom of Italy; and it was given to Austria by the Congress of Vienna in 1815 as the Lombardo-Venetian Kingdom.

**CIST**, a place of interment of an early or prehistoric period, consisting of a rectangular stone chest or inclosure formed of rows of stones set upright,



Cist, found near Driffield, Yorkshire.

and covered by similar flat stones. Such cists are found in barrows or mounds, inclosing bones. In rocky districts cists were sometimes hewn in the rock itself.

**CISTER'CIANS**, a religious order named from its original convent, Cîteaux not far from Dijon, in Eastern France, where the society was formed in 1098 by Robert, abbot of Molesme, under the strictest observance of the rule of St.



Cistercian.

Benedict. The Cistercians led a severely ascetic and contemplative life, and having freed themselves from episcopal supervision, formed a kind of spiritual republic under a high council of twenty-five members, with the abbot of Cîteaux as president.

**CIT'ADEL**, a strong fortress in or near a city intended to keep the inhabitants in subjection, or to form a final point of defense in case of an attack of enemies.

**CITA'TION**, a summons or official notice given to a person to appear in a court as a party or witness in a cause.

**CITH'ERN**, or **CIT'TERN**, an old instrument of the guitar kind, strung with wire instead of gut. Its eight



Cittern, in South Kensington museum.

strings were tuned to 4 notes, G, B, D, and E. It was frequently to be found in barbers' shops for the amusement of the waiting customers.

**CITIES OF REFUGE**, six out of the forty-eight cities, given to the tribe of Levi in the division of Canaan, set apart by the law of Moses as places of refuge for the man-slayer or accidental homicide. Their names were Kedesh, Shechem, and Hebron on the west side of Jordan; and Bezer, Ramoth-Gilead, and Golan on the east.

**CITIES OF THE PLAIN.** See Sodom and Gomorrah.

**CITIZEN**, an individual member of a political community or state. In the United States the term has the very same significance as it had under the Republic in ancient Rome, that is, a free individual, co-sovereign with all other free individuals, sharing the power of governing with those others. Citizenship in the United States is restricted to males, 21 years old, either born in the United States or its jurisdiction, or naturalized. The term citizen, however, is also applied in a more general way, to all persons, not aliens, living in the United States, whether they have the rights of sovereign citizens or not.

**CIT'RIC ACID**, the acid of lemons, limes, and other fruits. It is generally prepared from lemon-juice, and when pure is white, inodorous and extremely sharp in its taste. In combination with metals it forms crystalline salts known as citrates. The acid is used as a discharge in calico-printing and as a substitute for lemon in making beverages.

**CIT'RON**, a small evergreen shrub introduced into the southern parts of Europe from Asia, and yielding a fruit which is candied with sugar. The rind is considered superior to the pulp. The juice is less acid than that of the lemon. See Citrus.

**CIT'RUS**, an important genus of trees, characterized by simple ovate acuminate leaves or leaflets united by a distinct joint to the leaf-like stalk; by having the stamens united by their filaments into several irregular bundles, and by yielding a pulpy fruit with a spongy rind.—*Citrus mēdica* is the citron



Other species are the lemon, the sweet orange, the bitter orange, the shaddock, and the forbidden fruit, sometimes used as an ornamental addition to dessert. The genus furnishes the essential oils of orange and lemon peels, of orange flowers, of citron peel, of bergamot, and oil of orange leaves—all much esteemed in perfumery. See Lemon, Orange, etc.

**CITY**, in the United States, a municipality chartered by a state and having a magistrate called a mayor. In Britain a city is an incorporated town in which there is a cathedral. In ancient Rome and Greece, a city was synonymous with a state, as Rome and the city states of Greece. In Germany today there are certain "free cities," such as Hamburg. During the 19th century cities, in all parts of the world have grown so vastly at the expense of the country population that fear is expressed of the city ultimately swallowing up the rural population. In 50 years the city population of Britain has increased 20 per cent over the rural. In France the only increase has been in cities, the rural population having actually decreased, and in the United States 33 per cent of the people live in cities. Efforts to remedy this state of affairs have not been successful, as those who are making them persist in living in cities themselves.

**CIUDAD-REAL** (thi-ō-dād-rā-āl'), a town of Spain, capital of the province of same name. Pop. 14,769.—The province occupies the south extremity of New Castile, between the parallel ranges of the Sierra Toledo and Sierra Morena; area, 7840 sq. miles. Pop. 305,002.

**CIVET**, a genus of carnivorous mammals found in N. Africa, and in Asia from Arabia to Malabar and Java, and distinguished by having a secretory apparatus in which collects the odoriferous fatty substance known as civet. The animal, which in form is intermediate between the weasel and the fox, and from 2 to 3 feet long by 10 inches high, is of a cinereous color, tinged with yellow and marked by dusky spots disposed in rows. They are nocturnal, and prey upon birds and small animals, and may be considered as forming the transition from the musteline or marten kind to the feline race. The genus has been divided into two sub-genera—the true civets, having the pouch large and well marked; and the genets, in which there is a simple depression instead of a pouch. Two species of the first and eight of the second are at present known, the chief scent-yielding species being the common civet of N. Africa and the zibeth of Asia. The pouch is situated between the anus and the genitals, and the odorous matter obtained from it is, when good, of a clear yellowish or brown color, and of about the consistency of butter. In its natural state the smell is powerful and very offensive, but when largely diluted with oil or other materials it becomes an agreeable perfume.

**CIVIL ADMINISTRATION**, the method of conducting the affairs of a state in all those respects in which the interests of the individual come into conflict with the interests of the community, or which is virtually the same

thing, into conflict with the interests of other individuals. Civil administration varies in form from that of an absolute monarchy like Turkey, a feudalism such as that of India, or a federalism like that of the United States with its autonomy of commonwealth, county, town, and village. An aspect of civil administration, quite ancient, is that affecting colonies, which support an independent police and city administration, an elective government, and so on. The particulars of civil administration will be found explained in separate articles.

**CIVIL DAMAGE ACTS**, laws of certain states in the Union in which persons selling intoxicants are made liable for injuries sustained because of the intoxication by the person intoxicated.

**CIVIL DEATH**. See Death, Civil.

**CIVILIZATION**, the sum at any given time of the attainments and tendencies by which the human race or any section of it is removed from the savage state. The history of progress in civilization is usually presented from one of two points of view—the first conceiving the race as starting from a high civilization, to which in point of intellectual and moral power it has yet to return; the second viewing the civilization of any period as the result of a constant and increasingly-successful stream of effort upward from an origin comparable with the condition of the lower animals. The latter is the prevailing scientific theory, which finds the secret of progress in the interaction of function and environment. According to it primitive man, at first feeding on wild fruits and berries, and sheltering himself under overhanging rocks or caves, entered upon the stone age, in which, as the contemporary of the mammoth and cave-bear, he made himself sharp-edged tools by chipping the flakes of flint found in the drift under gravel and clay. In the newer stone age he learned the art of polishing these rough implements, with which he cut down trees to make canoes, killed wild animals for food, and broke their bones for marrow, or shaped them into weapons. Fire he turned to account to hollow out trees, to cook his food, to fashion clay ware. Artificial means of shelter were constructed by piling rude huts of stones, by digging holes in the ground, or by driving piles into the beds of lakes and raising dwellings on them. The artistic instincts found expression in drawings of animals scratched upon bone or slate. The discovery of metals constituted a great step in advance. Gold and copper came early into use, and bronze was soon discovered, though a long time passed before iron was smelted and substituted for bronze where hardness was required. Gradually the roving savage became a nomadic shepherd and herdsman, or a tiller of the soil, according to his environment. The practice of barter was in part superseded by the beginnings of some sort of currency. Gesture language gave place in part to an enlarged vocabulary, and picture-writing to the use of phonetic signs. In the meantime man had begun to question himself and the world on profounder issues, entering upon the myth-making age, in which was projected outward on the chief phenomena of nature some shadow of

his own personality. The worship of the sun, moon, and stars, a faith in a future life, the worship of dead ancestors, fetishes, animals, etc., the belief in magic and witchcraft, all sprang into being. Prayer came spontaneously to him; the idea of propitiation by sacrifice would arise from his dealings with his fellows and his foes; the sacred books began to shape themselves. Tribal and national relations, arising from ties of family and exigencies of defense, were cemented by unity of faith, and the higher social unit began to perfect itself under the rule of the patriarch, the bravest warrior, etc. With varying needs, arising from diversity of environment, distinctions of nationality became more and more emphatic, and the history of civilization becomes the history of the nations viewed from the philosophic standpoint.

**CIVIL LAW**, among the Romans the term nearly corresponding to what in modern times is implied by the phrase positive law, that is, the rules of right established by any government. They contradistinguished it from natural law, by which they meant a certain natural order followed by all living beings; also from the general laws of mankind established by the agreement of all nations and governments. The final digest of Roman law was made in the 6th century A.D. under the Emperor Justinian, but at first was only admitted as formally binding in a small part of Italy. After the 11th century, in Upper Italy, particularly in the school of Bologna, the body of the Roman law, put together by Justinian, was formed by degrees into a system applicable to the wants of all nations; and on this model the ecclesiastical and papal decrees were arranged, and to a considerable degree the native laws of the new Teutonic states. From all these the Roman law was distinguished under the name of civil law. In this sense, therefore, civil law means ancient Roman law; and it is contradistinguished from canon law and feudal law, though the feudal codes of the Lombards have been received into the body of civil law. As the Roman code exerted the greatest influence on the private law of modern Europe, the expression civil law is also used to embrace all the rules relating to the private rights of citizens. Under the term civil law, therefore, in both Europe and America, is to be understood not only the Roman law, but also the modern private law of the various countries; for example, in Germany, *Das gemeine Deutsche Privatrecht*; in France the *Code Civil des Français* or *Code Napoleon*. In this sense it is chiefly opposed to criminal law, particularly in reference to the administration of justice, which is to be divided into civil justice and criminal justice.

**CIVIL LIST**, a list of allowances made to government officials. The term is sometimes applied to the salary lists of officials in the United States, but more generally it is applied to the allowances made by European states to members of reigning families.

**CIVIL RIGHTS BILL**, a bill passed by congress in 1866, giving equality in



citizenship rights to all persons, except Indians not taxed. Its purpose was to secure civil rights to the newly emancipated negroes, a condition covered by the words of the statute "without regard to race, color, or previous condition of slavery or involuntary servitude except as a punishment for crime, whereof the party shall have been duly convicted."

**CIVIL SERVICE**, a term applied to all branches of public service in a state, or a government of any kind, exclusive of the army and the navy. In the United States the federal civil service employs 100,000 officials, pertaining to the nine general departments, of state, navy, treasury, post-office, war, agriculture, interior, justice, and labor and commerce, and congress. In state, city and county government civil service consists of virtually the entire machinery of these governmental units, the city having, as a matter of necessity, the largest number of employees.

**CIVIL SERVICE REFORM**, a movement beginning in the early part of the 19th century to purify the civil service of the federal government, and latterly extending to the purification of state, county, and city governments. The cause of civil service reform was the policy, instituted in 1829 by President Jackson, to the effect that "to the victor belong the spoils," spoils here meaning the "patronage," or positions in the gift of an administration. Each new administration would in turn clear the offices of their incumbents and replace them with men who helped to elect the party ticket. The merit system was introduced in 1875 after ten years of effort to pass it in congress, since which time the largest part of the civil service has been free from interference. Employees cannot now be removed "without cause." The reform has spread to certain states and cities, Chicago being an especial example of civil service reform among the larger cities.

**CIVIL WAR VETERAN SOCIETIES**. See Grand Army of the Republic, Sons of Veterans, etc., under their names.

**CLAFLIN**, Horace Brigham, an American business man, born in Massachusetts in 1811, died 1885. His house in New York, as early as 1865, did an annual volume of business of \$72,000,000, and since that time the house has probably been the largest in America.

**CLAIM**, in common law, the assertion of right of title to property of any kind. In the United States the term is used to designate the rights of settlers to government lands, and of prospectors to mining property found by them.

**CLAIMS, COURT OF**, a tribunal created by congress, or by the legislatures of the several states for the adjudication of claims against the government. A sovereign cannot be sued at the law and hence, the United States, or any of the separate states, being sovereign, cannot so be sued. It can be petitioned, however, and it is to provide for this process that courts of claims have been created.

**CLAIRVOYANCE**, an alleged faculty by which certain persons in certain states, or under certain conditions, are said to

be able to see things by some sort of mental or spiritual vision apart altogether from the sense of sight; thus they are said to be able to tell what an absent person is doing, to describe the contents of a closed box, etc. It is claimed that clairvoyance is the result of a kind of natural state of trance, or may be induced by mesmerism; and in evidence of its existence in ancient times the utterances of prophets, sybils, etc., have been adduced.

**CLAM**, the popular name of certain bivalvular shell-fish of various genera and species, e.g. the thorny clam, the yellow clam, the giant clam, the common clam of the United States, etc. The giant clam has the largest shell known, and the animal is used as food in the Pacific. The common U. States clam is also much used for food.

**CLAN**, among the Highlanders of Scotland, consisted of the common descendants of the same progenitor, under the patriarchal control of a chief, who represented the common ancestor. The name of the clan was frequently formed of that of the original progenitor with the affix mac (son): thus the MacDonalds were the sons of Donald, and every individual of this name was considered a descendant of the founder of the clan, and a brother of every one of its members. The chief exercised his authority by right of primogeniture, as the father of his clan: the clansmen revered and served the chief with the blind devotion of children. The clans each occupied a certain portion of the country, and hostilities with neighboring clans were extremely common. Next in rank to the chief were a certain number of persons, commonly near relations of the chief, to whom portions of land were assigned, during pleasure or on short leases. Each of these usually had a subdivision of the clan under him, of which he was chieftain, subject, however, to the general head of the sept. The jurisdiction of the chiefs was not very accurately defined, and it was necessary to consult, in some measure, the opinions of the most influential clansmen and the general wishes of the whole body.

**CLAN-NA-GÆL**, a secret society founded by patriotic Irishmen in the United States for the purpose of intimidating England into granting Ireland home rule. It is charged that the dynamite outrages in London in 1883 were due to Clan-na-Gael agents.

**CLARE**, a maritime county, Ireland, province Munster (capital, Ennis, between Galway Bay and the Shannon estuary; area, 827,994 acres, of which 140,000 are under tillage. Oats, potatoes, wheat, and barley are the principal crops. The chief minerals are limestone, lead, and slate, but the produce of the county is almost wholly agricultural. Lakes are numerous, but generally of small size, and the county is deficient in wood. The salmon-fisheries are valuable, and there are immense oyster-beds in some places. Pop. 112,129.

**CLARENDON**, George William Frederick Villiers, Earl of. He was educated at Cambridge, entered the civil service

at an early age, and in 1820 was attached to the embassy at St. Petersburg. In 1831 he was sent to France to negotiate a commercial treaty, and in 1833, as minister plenipotentiary at Madrid, was instrumental in negotiating the Quadruple Alliance signed in 1834. Having succeeded to his uncle's title in 1838 he returned home in the following year, and in Jan. 1840 was appointed lord privy-seal, and in October chancellor of the duchy of Lancaster. He supported the repeal of the corn-laws and the reduction of duties, and in 1846 was appointed president of the board of trade in Lord J. Russell's ministry, and in the following year Lord-lieutenant of Ireland. He resigned with his party in 1852, when the Earl of Derby took office, but soon after the formation of the Aberdeen ministry he was appointed to the foreign secretaryship, which he held until Jan. 1855. After a few weeks' interval he returned to the post under Lord Palmerston, and retained it until 1858, being one of the signatories of the Treaty of Paris. In 1861 Clarendon was sent as ambassador-extraordinary to the coronation of the King of Prussia, and in 1864 was appointed chancellor of the duchy of Lancaster. In the following administration, under Russell, he resumed the direction of the foreign office. He was sent in 1868 on a special mission to the pope and the King of Italy, and again occupied the post of foreign secretary in the Gladstone ministry till his death, in June, 1870.

**CLAR'ENDON PRESS**, the press of the University of Oxford. In January, 1586, delegates de impressione librorum were appointed by the Convocation of the university, Joseph Barnes and others after him being styled "Printer to the University." The management of the printing-office is committed to a delegacy consisting of the vice-chancellor and ten other members of Convocation. The north side of the present building, called the "learned" or classical side, is set apart for the printing of university documents and authorized books, the "south" for the printing of Bibles and Prayer-books.

**CLAR'ET**, the name given in Britain, and the United States, etc., to the red wines of Bordeaux. See Bordelais Wines.

**CLARIFICA'TION**, or the separation of the insoluble particles that prevent a liquid from being transparent, may be performed by depuration, in which the liquid is allowed to stand until the particles are precipitated, and then decanted; by filtration, or straining through wool, sand, charcoal, etc.; or by coagulation, in which the albumen contained in or added to the liquid is solidified and precipitated by the action either of heat or of acids, the extraneous substances being precipitated with it. See also Fining.

**CLAR'INET**, or **CLARIONET**, a wind-instrument of the reed kind, played by holes and keys. Its lowest note is E below the F clef, from which it is capable, in the hands of good performers, of ascending more than three octaves. Clarinets in A natural and B flat are those chiefly used in the orchestra, while instruments in B flat and E flat are used in reed bands.



## CLARK

**CLARK**, Alvan, an American optician and maker of telescope lenses, born in Massachusetts in 1808, died 1887. He founded an establishment at Cambridgeport, Mass., in 1844, at which have been ground the largest telescope lenses in the world.

**CLARK**, Alvan Graham, an American optician, son of Alvan Clark, born in Massachusetts in 1832, died 1897. He made the objectives of the great Lick and the great Yerkes observatories, and discovered the Companion Star to Sirius.

**CLARK**, George Rogers, an American soldier, born in Virginia in 1752, died in 1818. In 1778 he began his famous expedition into Illinois capturing



*Alvan Clark*

many of the French villages and defeated the English general, Hamilton in 1779. In 1783 the Virginia legislature made him a grant of 8000 acres for his services.

**CLARK**, John Bates, an American economist, born in Rhode Island in 1847. He is the originator of a new conception of economic science and has published several works of high value to social science and philosophy. Since 1895 he has been professor of economics at Columbia University.

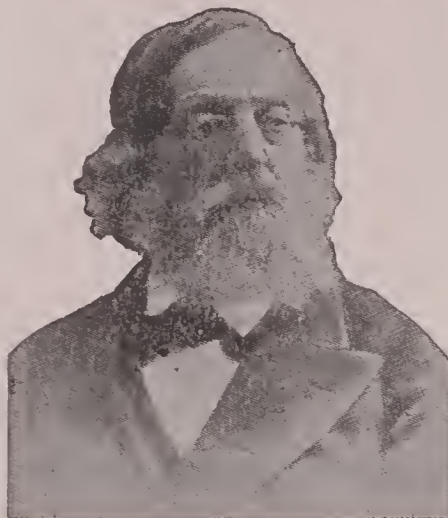
**CLARK UNIVERSITY**, founded at Worcester, Mass., in 1887 by Jonas Gilman Clark. It is exclusively a graduate school and has an endowment of upward of \$3,000,000. The University publishes *The American Journal of Psychology*, *The Pedagogical Seminary*, and *the Mathematical Review*.

**CLARK**, William, an American traveler and soldier, born in Virginia 1770, died in 1838. He was one of the commanders of the famous Lewis and Clark expedition and was engaged in the early fighting against the Indians. He was superintendent of Indian affairs at St. Louis from 1822 until his death.

**CLARK**, William Andrews, an American legislator and capitalist, born in

Pennsylvania in 1839. He emigrated to Montana in 1863 and acquired immense wealth as a merchant. He was elected in 1899 to the United States senate but was rejected by the committee on elections. He at once resigned from the senate but was forthwith appointed by the governor of Montana to the seat vacated by his resignation. In 1901 he was duly elected senator.

**CLARKE**, James Freeman, an American clergyman, born in New Hampshire in 1810, died in 1888. He began to



*James Freeman Clarke*

preach to Unitarian charges in 1833, and during his busy life published a mass of literature dealing with the liberal aspect of religion, the more important of which were *Christian Doctrine of Prayer*, *Orthodoxy, Its Truths and Errors*, *The Ten Great Religions*, *Common Sense in Religion*, *Essentials and Non-Essentials in Religion*, *Manual of Unitarian Belief*.

**CLARKE**, John Sleeper, an American actor, born in Baltimore in 1833, died in 1899. In 1867 he visited England where he succeeded so well that he took up his residence in that country although he afterward paid several visits to the United States.

**CLARKE**, William Horatio, an American musician and organist, born in Massachusetts in 1840. For ten years, until 1887, he was organist at Tremont Temple, Boston. He is the author of *A New Method for Reed Organs*, a work which has had a tremendous sale.

**CLARKSVILLE**, a city and the county-seat of Montgomery County, Tenn., 45 miles northwest of Nashville; near the junction of the Cumberland and Red rivers, and on the Louisville and Nashville Railroad. It is one of the great tobacco markets of the south, and has manufactures of iron, agricultural implements, etc. Pop. 11,232.

**CLASSIC**, a term derived from *L. classici*, the name given to the citizens belonging to the first or highest of the six classes into which the Romans were divided. Hence the Greek and Roman authors have been in modern times called classics, that is, the excellent, the models. The Germans, however, soon gave the word *klassisch* (classical) a wider sense, making it embrace: 1, the

## CLAUDIUS

standard works of any nation; and 2, ancient literature and art, in contradistinction to the modern.

**CLASSIFICATION** is commonly defined as the arrangement of things, or of our notions of them, according to their resemblances or identities; and its general object is to provide that things shall be thought of in such groups, and the groups in such an order, as will best promote the remembrance and ascertainment of their laws. As any collection of objects may be classified in a variety of ways, no fixed method can be laid down; but it will be obvious that in correct classification the definition of any group must hold exactly true of all the members of that group and not of the members of any other group. The best classification again will be that which shall enable the greatest possible number of general assertions to be made; a criterion which distinguishes between a natural and an artificial system of classification. Classification is perhaps of most importance in natural history—for example, botany and zoology. In the former the artificial or Linnæan system long prevailed, in opposition to the modern or natural.

**CLAUDI'ANUS**, Claudius (commonly called Claudian), a Latin poet, native of Alexandria, lived at the end of the 4th and beginning of the 5th century after Christ, under the Emperor Theodosius and his sons. He did much to recall to dying Rome the splendors of the Augustan literature, ranking considerably above any other of the later poets. Besides several panegyric poems on Honorius, Stilicho, and others, we possess two of his epic poems, the *Rape of Proserpine*, and an unfinished *War of the Giants*, eclogues, epigrams, and occasional poems.

**CLAU'DIUS**, often also called Clodius, the name of a distinguished Roman family of antiquity. See Appius Claudius.

**CLAU'DIUS**, or, in full Tiberius Claudius Drusus Nero Germanicus, a Roman emperor, son of Claudius Drusus Nero, stepson of Augustus and Antonia,



Tiberius Claudius.

the daughter of Augustus's sister; born at Lyons (10 B.C.). He lived in privacy, occupying himself with literature, the composition of a Roman history, and



other works, until the murder of Caligula, when he was dragged from his hiding-place and proclaimed emperor (41 A.D.). The early years of his reign were marked by the restoration of the exiles, the embellishment of Rome, the addition of Mauritania to the Roman provinces, and successes in Germany and Britain. But latterly he became debauched, left the government to his wives, and in particular to Messalina, who with his freedmen committed the greatest enormities. He was poisoned by his fourth wife, Agrippina (mother of Nero), A.D. 54.

**CLAVICLE**, the collar-bone, a bone forming one of the elements of the shoulder girdle in vertebrate animals. In man and sundry quadrupeds there are two clavicles each joined at one end to the scapula or shoulder-bone, and at the other end to the sternum or breast-bone. In many quadrupeds the clavicles are absent or rudimentary, while in birds they are united in one piece popularly called the "merry-thought."

**CLAY**, the name of various earths, which consist of hydrated silicate of aluminium, with small proportions of the silicates of iron, calcium, magnesium, potassium, and sodium. All the varieties are characterized by being firmly coherent, weighty, compact, and hard when dry, but plastic when moist, smooth to touch, not readily diffusible in water, but when mixed not readily subsiding in it. Their tenacity and ductility when moist and their hardness when dry has made them from the earliest times the materials of bricks, tiles, pottery, etc. Of the chief varieties porcelain-clay, kaolin, or china-clay, a white clay with occasional gray and yellow tones, is the purest. Potter's-clay and pipe-clay, which are similar but less pure, are generally of a yellowish or grayish color, from the presence of iron. Fire-clay is a very refractory variety, always found lying immediately below the coal; it is used for making fire-bricks, crucibles, etc. Loam is the same substance mixed with sand, oxide of iron, and various other foreign ingredients. The boles, which are of a red or yellow color from the presence of oxide of iron, are distinguished by their conchoidal fracture. The ochres are similar to the boles, containing only more oxide of iron. Other varieties are fuller's-earth, Tripoli, and boulder-clay, the last a hard clay of a dark-brown color, with rounded masses of rock of all sizes embedded in it, the result of glacial action. The distinctive property of clays as ingredients of the soil is their power of absorbing ammonia and other gases and vapors generated on fertile and manured lands; indeed no soil will long remain fertile unless it has a fair proportion of clay in its composition.

**CLAY**, Henry, an American statesman, born at Richmond, Virginia, in 1777. After acting as clerk in two or three state offices he commenced business in 1797 as a lawyer at Lexington, Kentucky. He soon became famous as a public speaker, and at the age of twenty-six was a member of the Kentucky legislature. In 1806 he was elected to the United States Senate; and in 1811 to the House of Representatives,

where he was at once made speaker. In 1814 he proceeded to Europe and acted as one of the commissioners for adjusting the treaty of peace at Ghent between America and Great Britain. He was an unsuccessful candidate for the presidency in 1824, 1832, and 1844.



H. Clay

He is best known for his endeavors to shut out European influences from America, and in connection with the "Missouri Compromise of 1820," restricting slavery to the states south of lat. 36° 30' n.; and another similar compromise of 1850 regarding the admission of California, New Mexico, and Utah, etc. He died at Washington in 1852.

**CLAYMORE**, formerly the large two-handed, double-edged sword of the Scotch Highlanders; now a basket-hilted, double-edged broadsword.

**CLAY-SLATE**, in geology, a rock consisting of clay which has been hardened and otherwise changed, for the most part extremely fissile and often affording good roofing-slate. In color it varies from greenish or bluish gray to lead color. The cleavage is independent of the stratification. It rarely lies parallel to the bedding, generally crossing the strata at all angles.

**CLAYTON-BULWER TREATY**, a treaty between the United States and Britain ratified in 1850, establishing the relations of the two countries as to their powers over the projected inter-oceanic canal across the Isthmus of Panama. According to its provisions neither power was to fortify, nor exclusively control the canal or any part of central America, its neutrality was to be preserved, and other powers were to be invited to participate in these agreements. The treaty was superseded by the Hay-Pauncefote treaty of 1901.

**CLEARANCE OF VESSELS**, the examination of them by the proper custom-house officers, and the giving of a certificate that the regulations have been duly complied with. Vessels are said to clear inward or outward according as they arrive or set sail.


**CLEARING HOUSE**, an institution in a city by which the banks of the city can settle all their relations to each other by a single transaction instead of


each bank settling separately with the other. In the United States there are nearly 100 clearing houses, the largest being that of New York, the clearings of which are about \$80,000,000,000 (eighty billions) annually. The total clearings of all the banks in the country are about \$120,000,000,000, or one hundred and twenty thousand million of dollars annually. American clearing houses are united in an association which has proved quite helpful to business.

**CLEAVAGE**, the manner or direction in which substances regularly cleave or split. The regular structure of most crystallized bodies becomes manifest as soon as they are broken. Each fragment presents the form of a small polyhedron, and the very dust appears under the microscope an assemblage of minute solids, regularly terminated. The directions in which such bodies thus break up are called their planes of cleavage; and the cleavage is called basal, cubic, diagonal, or lateral (or peritomous), according as it is parallel to the base of a crystal, to the faces of a cube, to a diagonal plane, or to the lateral planes. In certain rocks again there is a tendency to split along planes which may coincide with the original plane of stratification, but which more frequently cross it at an angle. This tendency is the consequence of the readjustment by pressure and heat of the components of rocks, which is one of the phases of metamorphism.

**CLEVELAND**, Moses, an American soldier and pioneer, the founder of the city of Cleveland, Ohio. The change of the form of the name was due to the fact that the editor of a newspaper spelled the name without the letter *a* in the first syllable because of lack of space. Cleaveland was born in Connecticut in 1754 and died in 1806.

**CLEF** (French for key), in music, a sign placed on a line of a staff, and which determines the pitch of the staff and the name of the note on its lines. There are three clefs now in use: the treble or

G clef,  written on the second line; the

mean or C clef,  which may be placed

on the first, second, third, or fourth lines;

and the bass or F clef,  seated on the

fourth line. The mean clef is very seldom used in writing vocal music in England.

**CLEM'ATIS**, a genus of woody climbing plants. The most common species, virgin's bower or traveler's joy, is conspicuous by its copious clusters of white blossoms, and afterward by its feather-tailed silky tufts attached to the fruits.

**CLEM'ENS**, Samuel Langhorne, an American humorist, more generally known by his pseudonym "Mark Twain," born in Missouri in 1835. He worked for some time as a compositor in Philadelphia and New York, and then in 1855 learned the business of pilot on the Mississippi. Thence he went to the Nevada mines; became in 1862 local editor of a newspaper in Virginia City; went to San Francisco; was for some time a reporter, and worked in the



Calaveras gold-diggings. In 1866 he went to the Sandwich Islands, and on his return commenced his lecturing career. He edited for a time a paper in Buffalo, and finally married and settled in Hartford, Conn. Mr. Clemens undertook publishing, but failed, and settled dollar for dollar. He removed to England, recovered much of his fortune by writing, and recently came to the United States to spend his remaining years in New York. His chief books are the *Jumping Frog*, etc., *Roughing It*, *The Innocents Abroad*, *Tom Sawyer*, *A Tramp Abroad*, *Life on the Mississippi*, *Huckleberry Finn*, *American Claimant*, *Tom Sawyer Abroad*, *The Prince and The Pauper*, *An American at King Arthur's Court*.

**CLEM'ENT**, the name assumed by many popes, the first being Clement of Rome. Clement XIV., who abolished the order of Jesuits, was one of the most distinguished. He died in 1774.

**CLEMEN'TI**, Muzio, pianist and composer, born in Rome in 1752. As early as his twelfth year he wrote a successful mass for four voices. He went in 1780 to Paris, and in 1781 to Vienna, where he played with Mozart before the emperor. In 1784 he repeated his visit to Paris, but after that remained in England till 1802, when he went back to the Continent. He returned in 1810 to England, where he settled down as superintendent of one of the principal musical establishments in London. He died in 1832, and was interred in Westminster Abbey. He represented perhaps the highest point of technique of his day, and his influence upon modern execution has led to his being characterized as "the father of pianoforte playing."

**CLEOPAT'RA**, a Greek queen of Egypt, born B.C. 69, the eldest daughter of Ptolemy Aulētēs. When she was seventeen her father died, leaving her as joint-heir to the throne with his eldest son Ptolemy, whom she was to marry—such marriages being common among the Ptolemies. Being deprived of her part in the government (B.C. 49) she won Cæsar to her cause, and was reinstated by his influence. In a second disturbance Ptolemy lost his life, and Cæsar proclaimed Cleopatra queen of Egypt; though she was compelled to take her brother, the younger Ptolemy, then eleven years old, as husband and colleague. Cæsar continued some time at Cleopatra's court, had a son by her named Cæsarion (afterward put to death by Augustus), and gave her a magnificent reception when she subsequently visited him at Rome. By poisoning her brother she remained sole possessor of the regal power, took the part of the triumvirs in the civil war at Rome, and after the battle of Philippi sailed to join Antony at Tarsus. Their meeting was celebrated by splendid festivals; she accompanied him to Tyre, and was followed by him on her return to Egypt. After his conquest of Armenia he again returned to her and made his three sons by her, and also Cæsarion, kings. On the commencement of the war between Augustus and Antony the latter lost a whole year in festivals and amusements with Cleopatra at Ephesus,

Samos, and Athens, and when at last the fleets met at Actium, Cleopatra suddenly took to flight, with all her ships, and Antony, as if under the influence of frenzy, immediately followed her. They fled to Egypt, and declared to Augustus that if Egypt were left to Cleopatra's children they would thenceforth live in retirement. Augustus, however, demanded Antony's death and advanced on Alexandria. Believing Cleopatra, who had taken refuge in her mausoleum, to be treacherous and dead, Anthony threw himself on his sword, and shortly afterward Cleopatra killed herself by applying an asp to her arm to escape the ignominy of being led in a Roman triumph (B.C. 30). With her the dynasty of the Ptolemies ended.

**CLEOPATRA'S NEEDLES**, the name given to two Egyptian obelisks, formerly at Alexandria, but one of which is now in London, the other in New York. They are made of the rose-red granite of Syene, and were originally erected by the Egyptian king Thothmes III. in front of the great temple of Heliopolis, the On of the Scriptures, where Moses was born and brought up. They were taken to Alexandria shortly before the commencement of the Christian era, and after the death of Cleopatra, but possibly in pursuance of a design originated by her. The London obelisk, which stands on the Thames Embankment, was presented to the British government in 1820, but was long left uncared for. In 1877-78, however, it was brought to London by the private munificence of Sir Erasmus Wilson, and erected in its place at a cost of some \$50,000. The New York obelisk was presented to the U. States by the Khedive of Egypt, and was set up in the Central Park in 1881. Each is about 70 feet high and inscribed with numerous hieroglyphics.

**CLERGY**, the body of ecclesiastical persons, in contradistinction to the laity. At first there was no strongly-marked distinction between clergy and laity, but the former soon drew apart, consisting, after the apostolic age, of bishops, priests, and deacons, and in the 4th century of many additional inferior orders, such as sub-deacons, acolytes, etc. With the increased complexity of the hierarchy there was a steady accretion of privileges until the burden of these became intolerable to the laity. The Episcopalians recognize three classes of clergy—bishops, priests, and deacons; and generally hold the doctrine of the apostolic succession. Large numbers of Protestants however, reject this dogma, and believe in the ministry of only one order. The Catholic clergyman, according to the doctrine of the Roman Catholic Church, is endowed in his spiritual character with a supernatural power, which distinguishes him essentially from the layman.

**CLEVELAND**, a city of Ohio, capital of Cuyahoga County, on the Cuyahoga river, 255 miles from Cincinnati, 343 miles from Chicago, and 183 miles from Buffalo. Population in 1908, 525,000. It has an area of 33 sq. miles and is built upon a gentle slope from the bank of Lake Erie, the river cutting the city

into two parts. The business part of the city extends eastward from the lower reaches of the river, parallel with the lake-front, for about a mile.

Among the principal buildings are the Central Armory, the Cleveland Grays' Armory, the Western Reserve Historical Society Library, Women's College, Lakeside Hospital, several lesser hospitals, U. S. building, Northern Ohio Insane Asylum, House of Correction, Adelbert College, Case School of Applied Science, Cleveland Medical College, city-hall, county court-house, and Union Railway Dépôt. The board of education has under it 73 schools with 58,000 enrolled pupils, of whom 3,460 boys and girls are in the five high schools. The Cleveland Public Library, opened in 1853, has about 150,000 volumes, and is free; the Case Library Association, with property valued at \$600,000, maintains for subscribers a circulating and reference collection of over 45,000 volumes; the Law Library, opened in 1870, has 20,000 volumes; the Western Reserve Historical Society has 25,000 books and a valuable collection of antiquities.

The city is governed by a mayor and a city council, comprising two representatives for each of the 11 districts formed from the 42 wards.

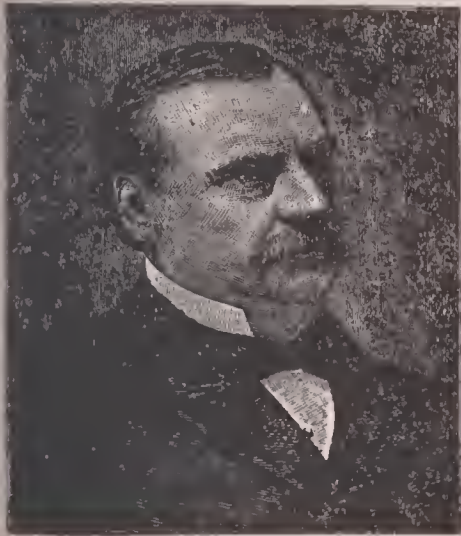
The Lake Shore and Mich. Southern, the Erie, the N. Y., Chicago and St. L. (Nickel Plate), the Cl., Cin., Chic. and St. L., the Cleveland and Pittsburgh, as part of the Pennsylvania system, and the Balt. and Ohio, are six great trunk lines carrying the traffic of Cleveland, while several smaller railways enter the city. The lake commerce is large and expanding, and fine passenger steamers run daily to various ports on the Great Lakes. Six suburban street railways radiate from Cleveland.

Cleveland is an important manufacturing center. In the building of iron and steel vessels Cleveland surpasses all lake ports, on the average of the last ten years. Sternposts and shafts for U. States naval vessels built on the Atlantic coast are forged in Cleveland; also heavy castings and forgings for bridges, street-railway machinery, and lifts for unloading vessels. Here is the center of the malleable-iron trade in the U. States. Important optical instruments and their mountings are made in Cleveland. Petroleum refining, hardware, boots and shoes, and chemicals give rise to important industries.

**CLEVELAND**, Grover, twenty-second president of the U. States, born in New Jersey in 1837. He settled in Buffalo, and having acquired an excellent position as a lawyer was elected mayor in 1881. Next year he was elected by the democrats governor of New York State, and in 1884, having been nominated for the presidency by the democratic national convention at Chicago, was elected on Nov. 4. Civil service reform and tariff reform were advocated by him during his tenure of office, which came to an end in 1889. President Harrison then succeeded, but Cleveland was again elected president in 1892. His second administration was marked by the Venezuela boundary dispute with Britain in which Mr. Cleveland



practically threatened war on England. His administration kept clear of Cuban affairs which confronted Mr. McKinley, his successor. He has lately become



Grover Cleveland.

identified with one of the large life insurance companies. He died in 1908.

**CLIFF-DWELLER**, a name given to a certain extinct people who presumably built and inhabited the cliff ruins which abound in southwest Colorado. Several expeditions have been made to these ruins but with little effect. It is held by some that the cliff dwellers were the ancestors of the Pueblo Indians.

**CLIMACTERIC**, according to an old theory, a critical period in human life in which some great alteration is supposed to take place in the constitution. The first climacteric is, according to some, the seventh year; the others are multiples of the first, as 14, 21, etc.; 63 is called the grand climacteric.

**CLIMATE**, the character of the weather or atmospheric phenomena peculiar to every country as respects heat and cold, humidity and dryness, the direction and force of the prevailing winds, the alteration of the seasons, etc., especially as such conditions affect animal and vegetable life. In general, geographical latitude is the principal circumstance to be taken into view in considering the climate of a country, and thus the torrid, temperate, and frigid zones may each be said roughly to have a climate of its own. The highest degree of heat is found in the equatorial regions, and the lowest, or the greatest degree of cold, at the poles. In the former the temperature continues practically the same all the year round, though there may be alternating rainy seasons and dry seasons. The variations in temperature are very considerable in the temperate zones, and increase as we approach the polar circles. The heat of the higher latitudes, especially about 59° or 60°, is, in July, greater than that of countries 10° nearer the equator, and at Tornea, in Lapland, where the sun's rays are very oblique even in summer, the heat is sometimes equal to that of the torrid zone, because the sun is almost always above the horizon. But even in the equatorial regions, and still more in intermediate

regions, the temperature is affected by local configuration and circumstances. In the deserts of Africa, for instance, owing to the exceptional radiating power of sandy plains and the absence of aqueous vapor in the atmosphere, the heat is excessive, while in the corresponding latitudes of south America the mountainous character of the country makes the climate more moderate. Altitude above the sea indeed has everywhere the same effect as removal to a greater distance from the equator, and thus in the Andes we may have a tropical climate at the sea-level and an arctic one on the mountain summits. The winds to which a country is most exposed by its situation have also a great influence on the climate. In the northern hemisphere if north and east winds blow frequently in any region it will be colder, the latitude being the same, than another which is often swept by milder breezes from the south and west. The climate of southern Europe, for instance, is decidedly affected by the warm south winds which blow from the hot deserts of Africa. The greater or lesser extent of coast-line a country possesses in proportion to its area has a decided influence on the climate. The almost unvarying temperature of the ocean equalizes in some degree the periodic distribution of heat among the different seasons of the year, and the proximity of a great mass of water moderates, by its action on the atmosphere, the heat of summer and the cold of winter. Hence the more equable temperature of islands and coasts as compared with that of places far inland, and hence the terms insular climate and continental climate. The British Isles, Tasmania, and New Zealand enjoy a mild or insular climate as compared with, say, Central Russia, or Central Asia. Thus it happens that London has a milder winter and a cooler summer than Paris, though the latter is nearly 3° farther south. Similarly, though Warsaw and Amsterdam are almost in the same latitude, the mean annual temperature of the former is 46.48°, while it reaches at the latter 53.4° Fahr. The proximity of large masses of water involves also the presence of much aqueous vapor in the atmosphere, which may be condensed in abundant rains so as to greatly influence the plant-life of a country. Direction of mountain chains, set of ocean currents, nature of soil, are other modifying elements. In exhibiting graphically the chief climatic facts of a region various methods may be adopted, but in all the use of isothermal lines is one of the most instructive features. These are lines drawn on a map or chart connecting those places which have the same mean annual temperature or same mean summer and mean winter temperature. In this way we may divide the earth into zones of temperature which by no means coincide with the limits of the zones into which the earth is astronomically divided, and when compared with these on a map show interesting and instructive divergences. Geology teaches that vast changes have taken place in the climate of most if not of all countries, the causes of which are not fully understood.

**CLIMAX**, a rhetorical figure in which a series of propositions or objects are presented in such a way that the least impressive comes first, and there is a regular gradation from this to the most impressive or final.

**CLIMBERS**, a name applied to birds of the order Scansores from their climbing habits. They have two toes before and two behind, and are represented by parrots, cockatoos, etc.

**CLIMBING PERCH**, a singular fish, remarkable for having the pharyngeal bones enlarged and modified into a series of cells and duplications so that they can retain sufficient water to keep



Climbing perch.

the gills moist and enable the fish to live out of water six days. The climbing perch of India proceeds long distances overland in search of water when the pools in which it has been living have dried up.

**CLIMBING PLANTS** are plants of weak stems which naturally seek support from their surroundings to rise from the ground. Some are twining plants, rising by winding themselves or their tendrils round the trunks of trees, etc. Such are the honey-suckle and scarlet-runner. Others, like the ivy, attach themselves by small roots developed from the stem as they ascend. Some in climbing always twine spirally from right to left, others again always take the opposite direction.

**CLINICAL MEDICINE**, that department of medicine which teaches how to investigate, at the bedside of the sick, the nature of diseases, to note their course and termination, and to study the effects of the various modes of treatment to which they are subjected. A clinical lecture is the instruction which the teacher gives his pupil at the bedside of the patient.

**CLINOMETER**, an instrument used for taking the dip and strike of rock strata.

**CLINTON**, a town in Iowa, on the Mississippi, 42 miles above Davenport, with railway workshops, foundries, etc. Pop. 26,820.

**CLINTON**, DeWitt, an American statesman, born in New York state in 1769, died in 1828. He became a lawyer and was one of the opponents of the federal constitution. In 1802 he was elected U. States senator from New York, but resigned to become mayor of New York City, a post he filled until 1815. In 1812 he was republican candidate for president but was defeated by Madison. His greatest service was the persistent work he did for the promotion of the Erie canal.

**CLINTON**, George, an American statesman, born in New York state in 1739, died in 1812. He was a member of the continental congress, was a brigadier-general on the revolutionary army, and the first governor of New



## CLINTON

York, a position he held until 1805, when he became vice-president of the U. States, filling that office until the time of his death. He opposed the adoption of the federal constitution.

**CLINTON**, Sir Henry, a British general who served in the Hanoverian war, and was sent to America in 1775 with the rank of major-general, where he



Sir Henry Clinton.

distinguished himself in the battle of Bunker Hill. He defeated the Americans at Long Island, but had to evacuate Philadelphia to Washington. In 1782 Clinton retired to England. He died in 1795.

**CLIO**, in Greek mythology, daughter of Zeus and Mnemosyne; the muse of history. Her attributes are a wreath of laurel upon her head, a trumpet in her right hand, and a roll of papyrus in her left.

**CLIPPER**, a modern build of sailing ship, having a long sharp bow, the greatest beam abaft the center, and a great rate of speed.

**CLIVE**, Robert, Lord Clive and Baron of Plassey, English general and statesman, was born in 1725 in Shropshire. In his nineteenth year he entered the East India Company's service at Madras as a writer, but in 1747 quitted the civil for the military service. In 1751 Clive, who had already a reputation for skill and courage, marched on the large city



Lord Clive.

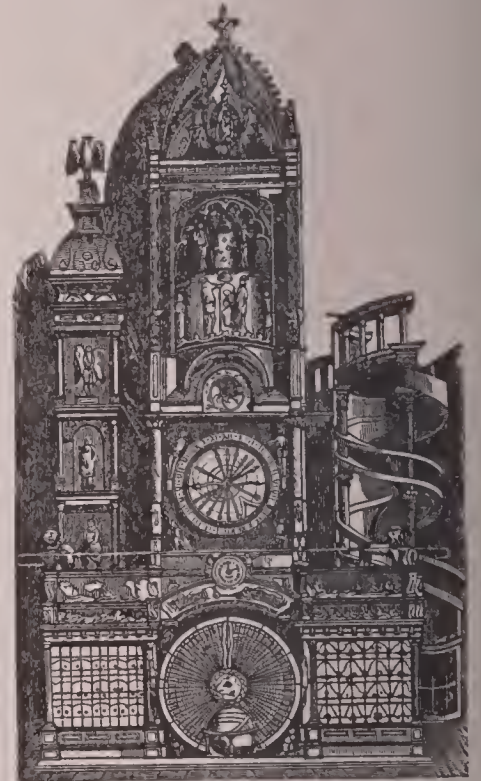
of Arcot with 200 British troops and 300 Sepoys, and took it, although strongly garrisoned, without a blow, withstood a siege by Chunda Sahib for nearly two months, and at last routed the enemy, took possession of important posts, and returned to Madras completely victorious. In 1753 he sailed to England to recover his health, and was received with much honor. Two

years later he was back in India, in his governorship of St. David's, from which he was soon summoned to command the expedition sent to Bengal, where the nabob Suraj-ud-Dowlah had attacked the British, destroyed their factories, taken Calcutta, and suffocated over 120 of his prisoners in the Black Hole. Clive soon took possession of Calcutta and brought Suraj-ud-Dowlah to terms, but having no trust in the loyal intentions of the nabob he resolved to dethrone him. With the help of Meer Jaffier, one of the nabob's officers, he effected his purpose, and in the battle of Plassey completely overthrew Suraj-ud-Dowlah's forces. Meer Jaffier now became the new nabob, and Clive was made governor of Calcutta. Here he was equally successful against the encroachments of the Dutch, defeating their forces both by sea and land. In 1761 he was raised to the Irish peerage with the title of Lord Clive, Baron of Plassey. In 1764 fresh troubles in India brought him back, but now as president of Bengal, with command of the troops there. Before his arrival, however, Major Adams had already defeated the Nabob of Oude, and Lord Clive had only the arranging of the treaty by which the Company obtained the disposal of all the revenues of Bengal, Bahar, and Orissa. In 1767 he finally returned to England. His health was by this time broken, and in one of his habitual fits of melancholy he put an end to his life, November 22, 1774.

**CLOCK**, an instrument for measuring time and indicating hours, minutes, and usually seconds, by means of hands moving on a dial-plate, and differing from a watch mainly in having the movement of its machinery regulated by a pendulum, and in not being portable. The largest and most typical clocks also differ in having their machinery set in motion by means of a falling weight or weights, the watch wheel-work being moved by the force of an uncoiling spring; but many clocks also have a spring setting their works in motion. The use of a horologium, or hour-teller, was common even among the ancients, but their time-pieces were nothing else than sun-dials, hour-glasses, and clepsydræ. In the earlier half of our era we have accounts of several attempts at clock construction: that of Boethius in the 6th century, the clock sent by Harun al Rashid to Charlemagne in 809, that made by Pacificus, archdeacon of Verona, in the 9th century, and that of Pope Sylvester II. in the 10th century. It is doubtful, however, if any of these was a wheel-and-weight clock, and it is probably to the monks that we owe the invention of clocks set in motion by wheels and weights. In the 12th century clocks were made use of in the monasteries, which announced the end of every hour by the sound of a bell put in motion by means of wheels. From this time forward the expression, "the clock has struck," is often met with. The hand for marking the time is also made mention of. In the 14th century there are stronger traces of the present system of clock-work. Dante particularly mentions clocks. Richard, abbot of St. Albans in England, made a clock

## CLOCK

in 1326, such as had never been heard of till then. It not only indicated the course of the sun and moon, but also the ebb and flood tide. Large clocks on steeples likewise were first made use of in the 14th century. Watches are a much later invention, although they have likewise been said to have been invented as early as the 14th century. A celebrated clock, the construction of which is well known, was set up in Paris for Charles V. in 1379, the maker being Henry de Vick, a German. It probably



Strassburg clock.

formed a model on which clocks were constructed for nearly 300 years, and until Huyghens applied the pendulum to clock-work as the regulating power, about 1657. The great advantage of the pendulum is that the beats or oscillations of a pendulum all occupy substantially the same time (the time depending on its length), hence its utility in imparting regularity to a time-measurer. The mechanism by which comparative regularity was previously attained, though ingenious and simple, was far less perfect; and the first pendulum escapement, that is, the contrivance by which the pendulum was connected with the clock-work, was also less perfect than others subsequently introduced, especially Graham's dead-beat escapement, invented in 1700. In a watch the balance-wheel and spring serves the same purpose as the pendulum, and the honor of being the inventor of the balance-spring was contested between Huyghens and the English philosopher Dr. Hooke. Various improvements followed, such as the chronometer escapement, and the addition of a compensation adjustment, by which two metals having unequal rates of expansion and contraction under variations of temperature are combined in the pendulum or the balance-wheel, so that, each metal counteracting the other, the vibrations are isochronous



under any change of temperature. This arrangement was perfected by Harrison in 1726, and is especially useful in navigation. See Watch.

**CLOIS'TER**, an arched way or gallery, often forming part of certain portions of monastic and collegiate buildings, usually having a wall of the building on one side, and an open colonnade, or a series



Part of the cloister—Westminster Abbey.

of windows with piers and columns adjoining an interior yard or court on the other side. Such galleries were originally intended as places of exercise and recreation, the persons using them being under cover. The term is also used as equivalent to convent or monastery.

**CLOSE CORPORATION**, a corporation which fills up its own vacancies, the election of members not being open to the public.

**CLOSE-HAULED**, in navigation, said of a ship when the general arrangement or trim of the sails is such as to enable her to sail as nearly against the wind as possible.

**CLO'SURE**, a rule in British parliamentary procedure adopted in 1887 by which, at any time after a question has been proposed, a motion may be made with the speaker's or chairman's consent "That the question be now put," when the motion is immediately put and decided without debate or amendment. So also if a clause of a bill is under debate a motion that it stand or be added may be put and carried in the same way. The motion must be supported by more than 100 members and opposed by less than 40, or have the support of 200 members. The introduction of the closure was intended to prevent debates from being too much spun out.

**CLOTH**, a fabric formed by interweaving threads or fibers of animal or vegetable origin, as wool, hair, cotton, flax, hemp, etc. Cloth may also be made by felting as well as by weaving. See Cotton, Woolen, Silk, etc.

**CLOTHES-MOTH**, the name common to several moths, whose larvæ are destructive to woolen fabrics, feathers, furs, etc., upon which they feed, using at the same time the material for the construction of the cases in which they assume the chrysalis state.

**CLOTHING**, the clothes or dress, that is the artificial coverings collectively, which people wear. Nothing is more necessary to comfort than that the body should be kept in nearly a uniform temperature, thus preventing the disturbance of the important excretory functions of the skin by the influence of

heat or cold. Hence in a changeable climate the question of clothing becomes of special importance. The chief end proposed by clothing ought to be protection from the cold. A degree of cold amounting to shivering cannot be felt without injury to the health, and the strongest constitution cannot resist the benumbing influence of a sensation of cold constantly present, even though it be so moderate as not to occasion immediate complaint, or to induce the sufferer to seek protection from it. This degree of cold often lays the foundation of the whole host of chronic diseases, foremost among which are found scrofula and consumption. The only kind of dress that can afford the protection required by the changes of temperature to which the cooler or temperate climates are liable, is woolen. Those who would receive the advantage which the wearing of woolen is capable of affording, must wear it next the skin; for it is in this situation only that its health-preserving power can be felt. The great advantages of woolen cloth are briefly these:—the readiness with which it allows the escape of sweat through its texture; its power of preserving the sensation of warmth to the skin under all circumstances; the slowness with which it conducts heat; the softness, lightness, and pliancy of its texture. Cotton cloth, though it differs but little from linen, approaches nearer to the nature of woolen, and on that account must be esteemed as the next best substance of which clothing may be made. Silk is the next in point of excellence, but it is very inferior to cotton in every respect. Linen possesses the contrary of most of the properties enumerated as excellencies in woolen. It retains the matter of perspiration in its texture, and

misery and suffering arising from it often begin while we are yet in the cradle.

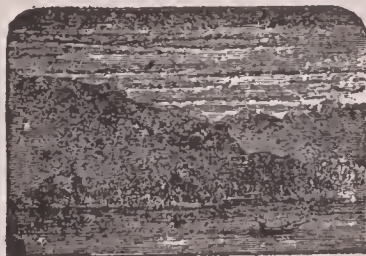
**CLOUD**, a collection of visible vapor or watery particles suspended in the atmosphere at some altitude. They differ from fogs only by their height and less degree of transparency. The average height of clouds is calculated to be  $2\frac{1}{2}$  miles, thin and light clouds being much higher than the highest mountains, while thick heavy clouds often touch low mountains, steeples, and even trees. Clouds differ much in form and character, but are generally classed (following Luke Howard, in his Essay on Clouds) into three single or primary forms, viz.:—1. The cirrus, so called from its resemblance to a lock of hair, and consisting of fibers which diverge in all directions. Clouds of this description float at a great height, usually from 3 to 5 miles above the earth's surface. 2. The cumulus or heap, a cloud which assumes the form of dense convex or conical heaps, resting on a flattish base, called also summer-cloud. Under ordinary circumstances these clouds accompany fine weather, especially in the heat of summer. They attain their greatest size early in the afternoon and gradually decrease toward sunset. 3. The stratus, so named from its spreading out uniformly in a horizontal layer, which receives all its augmentations of volume from below. It belongs essentially to the night, and is frequently seen on calm summer evenings after sunset ascending from the lower to the higher grounds, and dispersing in the form of a cumulus at sunrise. These three primary forms of clouds are subdivided as follows:—1. The cirro-cumulus, composed of a collection of cirri, and spreading itself frequently over the



Cloud—Cirrus.



Cloud—Cumulus.



Cloud—Stratus.



Cloud—Nimbus.

speedily becomes imbued with it; it gives an unpleasant sensation of cold to the skin; it is very readily saturated with moisture, and it conducts heat too rapidly. Clothes should be so made as to allow the body the full exercise of all its motions. The neglect of this precaution is productive of more mischief than is generally believed, and the

sky in the form of beds of delicate snow-flakes. 2. The cirro-stratus or wane-cloud, so called from its being generally seen slowly sinking, and in a state of transformation; when seen in the distance, a collection of these clouds suggests the resemblance of a shoal of fish, and the sky, when thickly mottled with them, is called in popular language a



mackerel sky. 3. The cumulo-stratus or twain-cloud, one of the grandest and most beautiful of clouds, and consisting of a collection of a large fleecy clouds overhanging a flat stratum or base. 4. The nimbus, cumulo-cirro-stratus, or rain-cloud, recognizable, according to Mr. Howard, by its fibrous border and uniformly gray aspect. It is a dense cloud spreading out into a crown of cirrus and passing beneath into a shower. It presents one of the least attractive appearances among clouds, but it is only when the dark surface of this cloud forms its background that the splendid phenomenon of the rainbow is exhibited in perfection.

**CLOUD-BURST**, a sudden and very heavy fall of rain. The term was first used in the United States and afterward in India, to describe the same phenomenon. Cloud-bursts occur frequently in the Rocky Mountains, in which 10 to 21 inches of rain fall within an hour.

**CLOUD ON TITLE**, a defect or fault in a title to realty. It may be removed by a proceeding in a court of equity.

**CLOVER**, or **TREFOIL**, a name of different species of plants. There are about 150 species. Some are weeds, but many species are valued as food for cattle. Common red clover, is a biennial, and sometimes, especially on chalky soils, a triennial plant. This is the kind most commonly cultivated, as it yields a larger product than any of the other sorts. White clover, is a most valuable plant for pasturage over the whole of Europe, Central Asia, and North America, and has also been introduced into South America. The bee gathers much of its honey from the flowers of this species.

**CLOVES**, a very pungent aromatic spice, the dried flower-buds of a native of the Molucca Islands, belonging to the myrtle tribe, now cultivated in Sumatra, Zanzibar, Malacca, Jamaica, etc. The



Clove.

tree is a handsome evergreen from 15 to 30 feet high, with large elliptic smooth leaves and numerous purplish flowers on jointed stalks. Every part of the plant abounds in the volatile oil for which the flower-buds are prized. The spice yields a very fragrant odor, and has a bitterish, pungent, and warm taste. It is sometimes employed as a hot and stimulating medicine, but is more frequently used in culinary preparations.

**CLOVIS**, King of the Franks, born 465, succeeded his father Childeric in the year 481, as chief of the warlike tribe of Salian Franks, who inhabited Northern Gaul. In 486 he overthrew the Roman governor at Soissons and occupied the country between the Somme

and the Loire. He died at Paris, which he had made his capital, on Nov. 27, 511, in the thirtieth year of his reign.

**CLOWN**, the buffoon or practical jester in pantomime and circus performances. On the old English stage the clown was the privileged laughter-provoker, who, without taking any part in the dramatic development of the piece represented, carried on his improvised jokes and tricks with the actors, often indeed addressing himself directly to the audience instead of confining himself to what was going on on the stage. In Shakespeare's dramas, a distinct part is assigned to the clown, who no longer appears as an extempore jester, although the part he plays is to a certain extent in keeping with his traditional functions. He is now confined to the pantomime and the circus.

**CLUB**, an association of men, or of men and women, or of women alone, for social purposes, for political purposes, or for purposes other than these. The club originated in England, but there is not in the United States, probably, a single club which, in its usages, is precisely similar to the English clubs. The London clubs originated in the coffee houses and the first of importance was that which met in the Mermaid Tavern. This was attended by Raleigh, Shakespeare, Beaumont and Fletcher and other literary celebrities of that time. The first political club was established in 1659 and from this time forward clubs grew in number and variety representing every art, profession, and business in existence, one may almost say. A bare list of the clubs of London would fill several pages of this book. London has scores of sporting clubs, athletic clubs, travelers' clubs, pistol and gun clubs, in short clubs for every kind of purpose which could possibly bring men together, from the study of oriental tongues to prize-fighting and moral reform.

In the United States the club idea has been expanded so as to include women and their purposes. — The women's clubs—organized chiefly for reform—are associated in a national federation which meets annually. This federation takes in not only the reform clubs of women but also self-improvement clubs, temperance clubs, art and press clubs and all clubs formed exclusively of women.

Of men's clubs in the United States. New York City is the center and its clubs are the most famous in America. Among them may be mentioned The Union Club (1836), The Century Club (1846), The Union League Club (1863), The University Club (1865), The Knickerbocker Club (1871), The Lotus, a literary club (1870), The Manhattan Club (1864), a political club, The Players' Club (1888) and the Lambs' Club. Chicago has a number of strong political clubs the more noted of which are the Marquette Club (republican) and the Iroquois (democratic). The Press Club of Chicago is the best known press club in the world. Every large city in the United States has its quota of clubs, virtually of the same character. In this country the tendency of the

larger clubs is to extend the lodging house feature of the establishment which until recently was not a general practice in American clubs.

**CLUB-FOOT**, a congenital distortion of the foot. There are several varieties. Sometimes the foot is twisted inward; sometimes the heel is raised and the toes only touch the ground; sometimes the foot is twisted outward; or it rests only on the heel. In most cases the deformity is curable by modern surgery.

**CLYDE** (klid), a river of Scotland, which has its sources amid the hills that separate Lanarkshire from the counties of Peebles and Dumfries, passes by Lanark, Hamilton, Glasgow, Renfrew, Dumbarton, Greenock, etc., and forms finally an extensive estuary or firth before it enters the Irish Sea, at the southern extremity of the island of Bute. From its source to Glasgow, where navigation begins, its length is 70 or 80 miles. The Clyde, by artificial deepening, has been made navigable for large vessels up to Glasgow, and is the most valuable river in Scotland for commerce.

**CLYDE**, Lord, Sir Colin Campbell, was born in Glasgow, in 1792. He served in Spain under Sir John Moore and Wellington, being engaged in the battles of Barossa and Vittoria, and



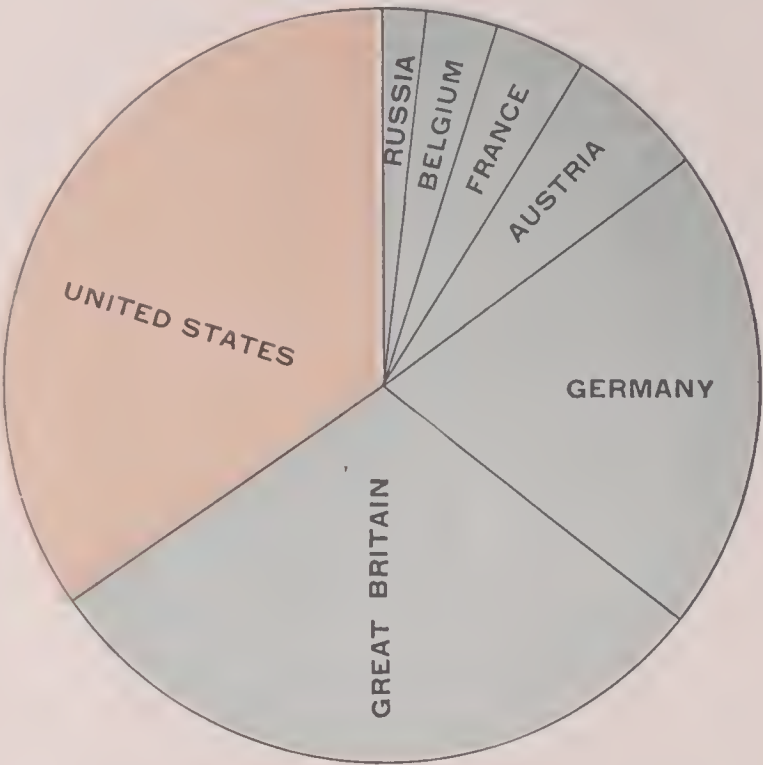
Lord Clyde.

having displayed distinguished gallantry at the siege of San Sebastian, where, as well as at the Bidassoa, he was severely wounded. In 1854 he became major-general, with the command of the Highland Brigade in the Crimean war. His services at the battles of Alma and Balaklava, and during the war generally, were conspicuous, so that on the outbreak of the Indian mutiny he was appointed to the chief command there. Landing at Calcutta on 29th August, 1857, he relieved Havelock and Outram at Lucknow, and crushed the rebellion entirely before the end of the year. For his services here Sir Colin received the thanks of both Houses of Parliament, was created a peer with the title of Baron Clyde. In 1862 he was made field-marshal. He died August 14, 1863, and was buried in Westminster Abbey.

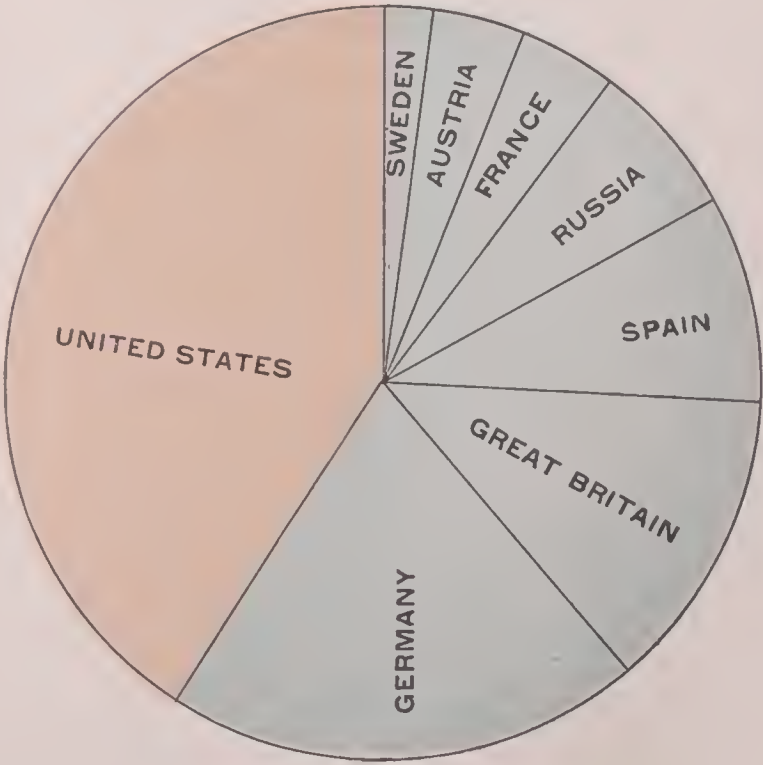
**CLYMER**, George, one of the signers of the Declaration of Independence, born in Philadelphia in 1739, died 1813. He was one of the treasurers of the continental congress and took part in the revolutionary war both as soldier



WORLD'S PRODUCTION OF COAL

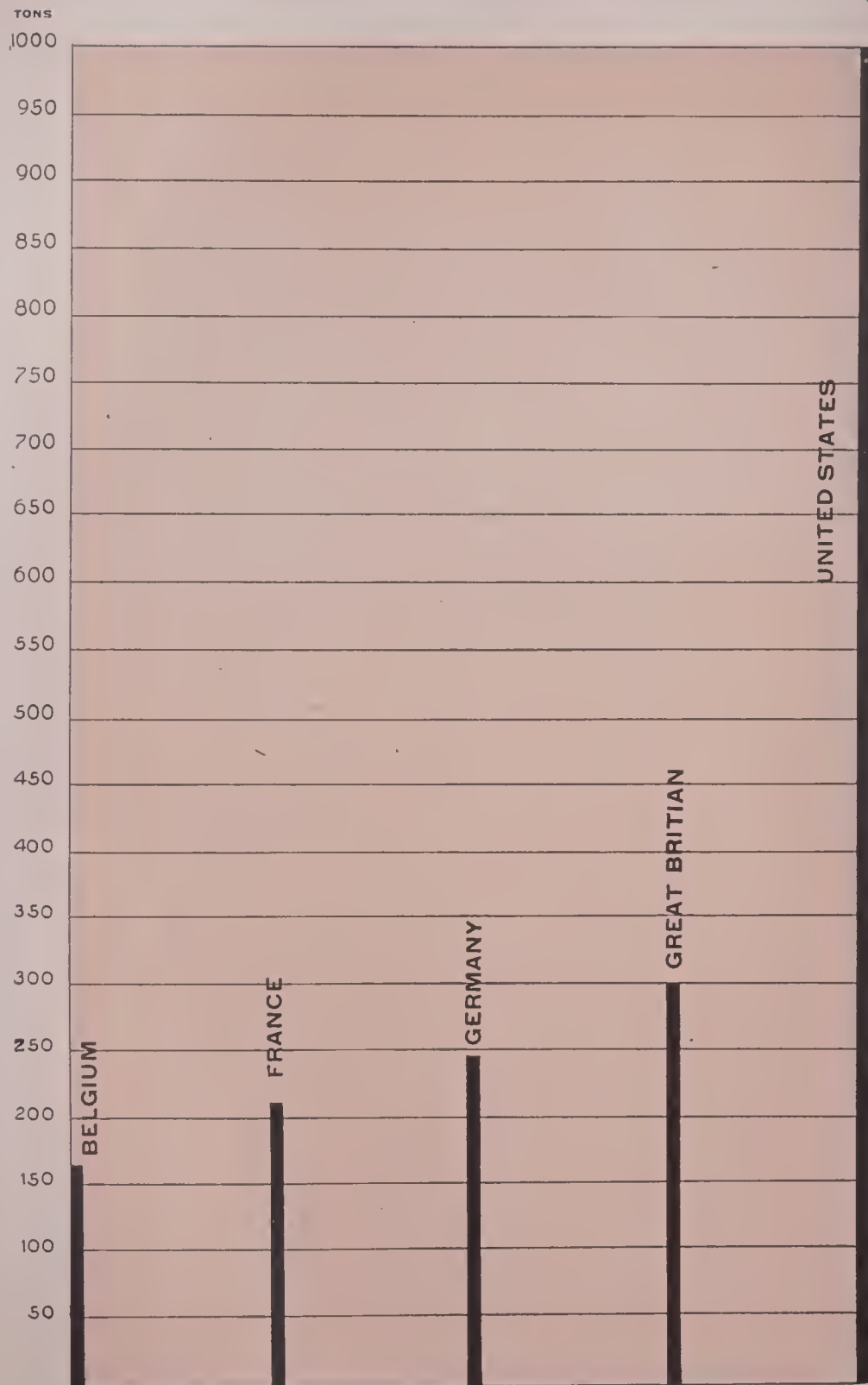


WORLD'S PRODUCTION OF IRON





## PRODUCTION OF COAL PER MINER.





and investigating delegate from congress. Clymer was a member of the constitutional convention of 1787 and a member of congress from 1789 to 1791.

**COACH**, a general name for all covered carriages drawn by horses and intended for the rapid conveyance of passengers. The earliest carriages appear to have been all open, if we may judge from the figures of Assyrian and Babylonian chariots found on the monuments discovered amid the ruins of Nineveh and Babylon. At Rome both covered and uncovered carriages were in use. After the fall of the Roman Empire they went out of use again, and during the feudal ages the custom was to ride on horseback, the use of carriages being considered effeminate. They do not appear to have become common till the 15th century, and even then were regarded exclusively as vehicles for women and invalids. Later on they became, especially in Germany, part of the appendage of royalty. They seem to have been introduced into England about the middle of the 16th century, but were for long confined to the aristocracy and the wealthy classes. Hackney-coaches were first used in London in 1625. They were then only twenty in number, and were kept at the hotels, where they had to be applied for when wanted. In 1634 coaches waiting to be hired at a particular stand were introduced, and had increased to 200 in 1652, to 800 in 1710, and to 1000 in 1771. Stage-coaches were introduced into England about the same time as hackney-coaches.—The first stage-coach in London appears to have run early in the 17th century, and before the end of the century they were started on three of the principal roads in England. Their speed was at first very moderate, about 3 or 4 miles an hour. They could only run in the summer, and even then their progress was often greatly hindered by floods and by the wretched state of the roads generally. In 1700 it took a week to travel from York to London; in 1754 a body of Manchester merchants started a conveyance, the Flying Coach, of an improved kind, which did the journey to London in the unusually short period of four days and a half, and thirty years later a Mr. Palmer of Bath, after a considerable amount of opposition, succeeded in inducing the government to put in practice certain suggestions which he made, by which he showed that great saving both of time and money in the conveyance of passengers and letters would be effected. The result was the establishment of the system of mail-coaches, which continued to be the means of traveling in England until their place was taken by the railways. The first mail-coach started between London and Bristol on the 8th of August, 1784.

The revival of coaching as a sport in recent years has caused, of course a revival of the industry of coach building, and elegant coaches are now turned out in Europe and the United States by numerous factories. The weight of a road coach varies from 2200 to 3000 pounds and it is drawn by four horses. The typical American

coach is that made at Concord, N. H. Other vehicles, such as hackney-coaches, landaus, etc., are not coaches at all. For their description see separate articles.

**COACH-DOG**, a short-haired dog of moderate size, and rather handsome shape, white with numerous black spots, kept as an attendant upon carriages, and of no use otherwise. Called also Dalmatian dog.

**COACHING**, the art or sport of driving a four-in-hand coach. Coaching as a necessary means of transportation is treated in the article on Coach (which see). Coaching was never brought to a high degree of perfection in America until it recently came into vogue as a pastime. In America it is used for sight seeing in large American and European cities, and in Europe until recently was practiced as a pastime. Today its place is almost entirely filled by the rapid growth of the automobile.

**COADJUTOR**, a Latin term, nearly synonymous in its original meaning with assistant. The term is especially applied to an assistant bishop appointed to act for and succeed one who is too old or infirm for duty.

**COAGULATION**, the changing of a fluid into a more or less solid substance, or the separation of a substance from a solution, through the substance becoming more or less solid. Thus albumen of egg can be dissolved in cold water, but if the solution be warmed, the albumen undergoes a change, separates out in white flocky masses, and cannot again be redissolved in the water. Coagulation is well exemplified by the "curdling" of milk and "clotting" of blood.

**COAHUILA** (kō-ā-wē'lā), a state of Mexico, on the frontier of the United States, rich in woods and pastures, and having several silver-mines; area, 50,890 square miles; pop. 280,899.

**COAL**, a solid, opaque, inflammable substance, mainly consisting of carbon, found in the earth, largely employed as fuel, and formed from vast masses of vegetable matter deposited through the luxuriant growth of plants in former epochs of the earth's history. In the varieties of coal in common use the combined effects of pressure, heat, and chemical action upon the substance have left few traces of its vegetable origin; but in the sandstones, clays, and shales accompanying the coal, the plants to which it principally owes its origin are presented in a fossil state in great profusion, and frequently with their structure so distinctly retained, although replaced by mineral substances, as to enable the microscopist to determine their botanical affinities with existing species. The great system of strata in which coal is chiefly found is known as the carboniferous. There are many varieties of coal, varying considerably in their composition, as anthracite, nearly pure carbon, and burning with little flame, much used for furnaces and malt kilns; bituminous (popularly so called) or "household coal;" and cannel or "gas-coal," which burns readily like a candle, and is much used in gas-making. All varieties agree in containing from 60 to over 90 per cent of carbon,

the other elements being chiefly oxygen and hydrogen, and frequently a small portion of nitrogen. For manufacturing purposes coals are generally considered to consist of two parts, the volatile or bituminous portion, which yields the gas used for lighting, and the substance comparatively fixed, usually known as coke, which is obtained by heating the coal in ovens or other close arrangements, and thus removing the volatile or smoke-yielding matter, while the full heating power of the coal still remains in the coke.

The principal coal deposits of Europe and America are found in the United States, Great Britain, Germany, France, Belgium, Russia, and Austria-Hungary. Coal is found in immense quantities in China and Japan, in India, and other oriental countries but its production there is limited. In the United States the largest deposits are found in the great coal belt of the Appalachians which extends from Pennsylvania to Alabama, a tract about 800 miles long and nearly 100 wide. In this region all kinds of coal are produced. Bituminous coal is produced in large quantities in Illinois, Indiana, and Kentucky. The western states from Colorado to the Pacific are also rich in coal but its mining is backward.

The coal production of the world at present is about 900,000,000 tons annually of which the United States produces 270,000,000, Great Britain 250,000,000 and Germany 165,000,000 tons. Austria Hungary comes fourth and falls to 40,000,000.

Coal is mined by means of shafts and tunnels which tap the seams in which great chambers are mined, the coal being transported underground on trucks, and brought to the surface through the shafts. Various improvements in machinery have recently facilitated the work, although coal mining still remains one of the most disagreeable and dangerous trades practiced.

**COAL BRASS**, the iron pyrites found in coal-measures, so named on account of its brassy appearance. Coal containing much pyrites is bad for iron smelting, and it is unpleasant for domestic use on account of the sulphurous acid which it gives off on burning. Coal brass is useful in the manufacture of copperas, and in alkali works.

**COAL-CUTTING MACHINE**, any machine for cutting out coal in the pit, the chief objects they are intended to serve being the cheapening of the work, the saving of a large quantity of coal, which in the ordinary process of holing by hand-labor with the pick is broken up into slack and dust, and the removal of the danger attending upon the employment of hand-labor. The instruments of excavation in these machines are constructed on various principles, some having an action like that of an ordinary pick, others a horizontal cutting-tool. There are usually arrangements for regulating the depth and force, and to a certain extent the direction of the blow, and the precision obtained is fully equal to that of hand-labor.

**COAL GAS**, the variety of carburetted hydrogen which produces common gas-light.



**COALING-STATIONS**, stations established by government at various important points throughout the world, where the ships, both of the navy and the mercantile marine, may obtain supplies of coal. The utility of such stations, when properly fortified, as points of refuge, defense, and repair for ships in the event of war can hardly be over-estimated.

**COALITION**, a term used in diplomacy and politics to denote a union between different parties not of the same opinions, but who agree to act together for a particular object. Among states it is understood to mean theoretically something less general in its ends, and less deeply founded than an alliance.

**COAL-TAR**, or **GAS-TAR**, a substance obtained in the distillation of coal for the manufacture of illuminating gas, a dark-colored more or less viscid mass, consisting principally of oily hydrocarbons. It passes over with the gas into the condenser, along with ammonia liquor, but being heavier than the latter, it is easily separated from it when the whole is allowed to stand. It was formerly of comparatively little use; but in recent years a great number of valuable products have been derived from it by distillation, such as ammonia, naphtha, creosote, carbolic acid, and benzine, while it is also the source of the whole series of aniline colors, and other dyes, of alizarine, salicylic acid, etc.

**COAL TAR COLORS**, dyes made from the combinations of various hydrocarbons derived from coal tar. The possibility of making these dyes was discovered by the German chemist, Runge, in 1834. This observation was carried farther by Perkins in 1856, but the most interesting discovery in this connection was that of the German chemists Graebe and Liebermann who made a color from anthracene which was really the coloring matter found in madder root. This was in 1868 and the progress of organic chemistry since then has made it possible to prepare from aniline and other hydrocarbons a variety of dyes varying infinitely in shade.

**COAST AND GEODETIC SURVEY**, The United States, a bureau pertaining to the department of the treasury, for the purpose of surveying the coasts and boundaries of the country and determining geographical positions in the interior. It was organized on the recommendation of President Jefferson in 1807 and its work since that time has included almost every region in the United States. Some of the important work done by the survey was triangulation, along the Atlantic coast to the Florida Keys, observation of the gulf stream, surveys of the boundary line between Alaska and British Columbia, soundings in all American waters, explorations of rivers and mountains, and magnetic observations in various parts of the country. The bureau issues a line of publications important for commerce, science, and defense.

**COAST ARTILLERY**, artillery for the defense of coasts. The United States uses 8, 10, and 12-inch breech loading guns, rapid-fire guns, and other forms

of ordnance. The 16-inch breech loading rifle of the United States is one of the largest and most effective rifles in existence. It requires a charge of 576 pounds smokeless, and 1176 pounds black powder, and fires a projectile of 2400 pounds, a velocity (muzzle) of 2300 feet per second. The Italian and French rifles are a little larger but not so effective. English coast artillery has not been brought to the same perfection or that of the United States.

**COAST DEFENSE**, the art of fortifying and defending a coast from an enemy. This is done by the use of large guns (see Coast Artillery), by tactics which obstruct the enemy's advance, by harassing the enemy from different points of attack with isolated instruments or boats, by mining the water with torpedoes, and by the use of search lights to disclose the enemy's location. Since modern coast defense methods have been perfected no good opportunity of testing it has offered. The test made by Dewey at Manila Bay in 1898 was not a fair one, as the Spaniards were not only poor tacticians but their torpedoes were worthless.

**COAT OF ARMS**. See Arms and Heraldry.

**COAT OF MAIL**, a piece of armor in the form of a shirt, consisting of a network of iron or steel rings, or of small laminæ or plates, usually of tempered iron, laid over each other like the scales of a fish, and fastened to a strong linen or leather jacket.

**CO'BALT**, a metal of a grayish-white color, very brittle, of a fine close grain, compact, but easily reducible to powder. It crystallizes in parallel bundles of needles. It is never found in a pure state, but usually as an oxide, or combined with arsenic or its acid, with sulphur, iron, etc. The great use of cobalt is to give a permanent blue color to glass and enamels upon metals, porcelain, and earthenwares.

**COBB**, Howell, an American legislator, born in Georgia in 1815, died in 1868. He was congressman for four terms until 1851, and in the last term was speaker of the house. His other positions were governor of Georgia (1855) secretary of the treasury in Buchanan's cabinet, and president of the congress which adopted the constitution of the confederacy. He was a bitter anti-reconstructionist.

**COB'DEN**, Richard, English politician, the "apostle of free trade," born in Sussex 3d June, 1804, died in London 2d April, 1865. His first political writing was a pamphlet on England, Ireland, and America, which was followed by another on Russia. In both of these he gave clear utterance to the political views to which he continued through his life rigidly to adhere, advocating non-intervention in the disputes of other nations, and maintaining it to be the only proper object of the foreign policy of England to increase and strengthen her connections with foreign countries in the way of trade and peaceful intercourse. Having joined the anti-corn-law league, formed in 1838, it was chiefly the extraordinary activity of Cobden, together with Bright and other zealous fellow-workers, which won vic-

tory for the movement. In 1841 Cobden entered parliament as member for Stockport, and after several years of unwearyed efforts at last induced Sir Robert Peel, then prime minister, to bring in a bill for the repeal of the corn



Richard Cobden.

laws, a measure which became law in 1846. His last great work was the commercial treaty which he was the means of bringing about between Britain and France in 1860. During his later years he lived a good deal in retirement.

**COBDEN CLUB**, an association formed about a year after the death of Mr. Cobden, mainly by the influence of Mr. Bright and Mr. T. B. Potter, for the purpose of encouraging the growth and diffusion of those economical and political principles with which Mr. Cobden's name is associated. The Cobden Club has distributed a vast number of books and pamphlets.

**COBRA DE CAPELLO**, the Portuguese name of the hooded or spectacled snake, which is found in Southern Asia, a closely allied species, also called cobra, or asp, being found in Egypt. It is called spectacled snake from a singular marking on the back of the neck, while its other name is given from the remarkable manner in which it spreads out the skin on the sides of the neck and head when disturbed or irritated, raising the anterior part of its body so as to appear to stand erect, and expanding its hood. So exceedingly poisonous is its bite, that in numerous instances death has followed within a few minutes, and under ordinary circumstances a few hours is the longest term where prompt measures have not been taken. But indeed recovery rarely takes place, though injection of potash into the veins is said to be a remedy. In India thousands of natives lose their lives yearly through cobra bites. Its food consists of small reptiles, birds, frogs, fishes (being an excellent swimmer), etc. Its great enemy is the ichneumon. It is one of the snakes that the snake-charmers perform tricks with.

**COBWEB**, the web or network spun by spiders to catch their prey.

**COCA**, a South American plant. The leaf is a stimulating narcotic, and is chewed by the inhabitants of countries on the Pacific side of South America, mixed with finely-powdered chalk. It has effects somewhat similar to those of opium. A small quantity of it enables a person to bear up against fatigue even when receiving less food than usual

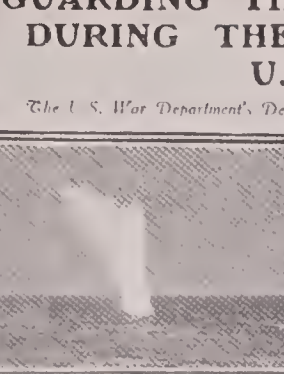


# GUARDING THE AMERICAN COASTS DURING THE ABSENCE OF THE U.S. FLEET.

*The U. S. War Department's Defence Guns which Protect the Eastern Shores of America*



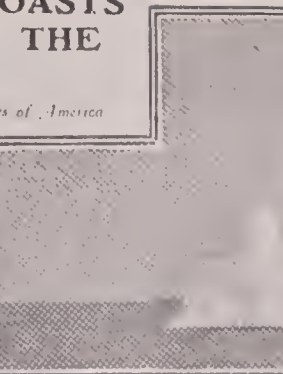
1,000-lb. Projectile Exploding



100-lb. Projectile Exploding



100-lb. Projectile Exploding



800-lb. Projectile Exploding



RAMMING HOME A PROJECTILE IN A 10-IN. DISAPPEARING GUN



FIRING THE 10-IN. GUN AT A HOSTILE FLEET

Recently at Boston a target  $4\frac{1}{2}$  miles from the fort and moving along the horizon at the rate of 5 miles an hour was struck by every shot fired from a 10-inch battery in less than four minutes, the number of shots being six. The following day a battery of 12-inch guns performed the same feat







and it prevents the difficulty of respiration experienced in climbing high mountains. Used in excess it brings on various disorders, and the desire for it increases so much with indulgence that a confirmed coca-chewer is said never to have been reclaimed. Coca-leaves depend for their influence on a crystallizable alkaloid called cocaine, which, besides having effect similar to the leaf, possesses valuable anæsthetic properties, and in recent times has been especially employed to prevent suffering in operations on the eye, having also similar effects when applied to the tongue, larynx, ear, etc.

**COCAINE** (kō'ka-in). See Coca.

**COCCUS**, a genus of insects of the order Hemiptera, family Coccidæ, or scale-insects. The males are elongated in their form, have large wings, and are destitute of any obvious means of suction; the females, on the contrary, are of a rounded or oval form, about an eighth of an inch in length, have no wings, but possess a beak or sucker, by which they suck up the juices of the plants on which they live. At a certain period of their lives the females attach themselves to the plant or tree which they inhabit, and remain thereon immovable during the rest of their existence. In this situation they are impregnated by the male; after which their body increases considerably, in many species losing its original form and assuming that of a gall, and, after depositing the eggs, drying up and forming a habitation for the young. Cochineal consists of the bodies of the females of the *Coccus cacti*, a native of Mexico, which feeds on various species of cactus, particularly on one called nopal.

**COCH'IN**, a small native state of India, on the s. w. or Malabar coast connected with the Presidency of Madras. Area, 1361 sq. miles; pop. 815,218.

**COCHIN-CHINA**, a country forming part of the peninsula of South-eastern Asia, and generally regarded as comprising the whole of Anam and Lower or French Cochin-China. The latter belonged to Anam till, in 1863 a portion of it was finally ceded to France after a war occasioned by the persecution of French missionaries; another portion being declared French territory in 1867. The territory thus acquired covers 21,710 sq. miles, and in 1894 had a pop. of 2,226,935.

**COCHIN-CHINA**, a term applied to a variety of the domestic fowl, imported from Cochin-China. It is a large ungainly bird, valuable chiefly owing to its fecundity, eggs being laid even during the winter.

**COCHINEAL** (koch'in-ēl), a dye-stuff consisting of the dried bodies of the females of a species of insect, a native of the warmer parts of America, particularly Mexico, and found living on a species of cactus called the cochineal-fig. The insects are brushed softly off, and killed by being placed in ovens or dried in the sun, having then the appearance of small berries or seeds. A pound of cochineal contains about 70,000 of them. The finest cochineal is prepared in Mexico, where it was first discovered, and Guatemala; but Peru, Brazil,

Algiers, the East and West Indies, and the Canary Islands have also entered into this industry with more or less success. Cochineal produces crimson and scarlet colors, and is used in making carmine and lake.

**COCHRANE**, John, an American legislator and soldier, born in New York State in 1813, died in 1898. He was democratic member of congress from 1856 to 1862 and was a brigadier-general in the Union army during the civil war. In 1864 he was candidate for the vice presidency with Fremont.

**COCK**. See Fowl.

**COCKADE'**, a plume of cock's feathers, with which the Croats in the service of the French in the 17th century adorned their caps. A bow of colored ribbons was adopted for the cockade in France, and during the French revolution the tricolored cockade—red, white, and blue—became the national distinction. National cockades are now to be found over all Europe.

**COCKATOO'**, the name of a number of climbing birds belonging to the family of the parrots. They have a large, hard bill; a crest, capable of being raised and lowered at the will of the bird, commonly white, but sometimes yellow, red, or blue; a tail somewhat longer than that of the parrot, and square or rounded; long wings; and, for the most



Leadbeater's cockatoo.

part, a white plumage, though in some genera the plumage is dark. They are found especially in the Eastern Archipelago and Australia. They live on roots, fruits, grain, insects, etc., and usually congregate in flocks. These birds are easily tamed, and when domesticated become very familiar.

**COCK'CHAFER**, a species of lamellicorn beetle, remarkable for the length of its life in the worm or larva state, as well as for the injury it does to vegetation after it has attained its perfect condition. The common cockchafer is hatched from an egg which the parent deposits in a hole about 6 inches deep, which she digs for the purpose. At the end of about three months the insect emerges as a small grub or maggot, and feeds on the roots of vegetables in the vicinity with great voracity. When full grown it is over an inch in length; it makes its way underground with ease, and commits great devastation on grass and corn crops. In the fourth year the insect appears as a perfect coleopterous insect—a beetle over an inch long, of a black color, with a whitish down. It usually emerges from the ground about

the beginning of May, from which circumstance the English name May bug or beetle has been given it. In its perfect state it is very destructive to the leaves of various trees.

**COCKER**, a dog of the spaniel kind, allied to the Blenheim dog, used for raising woodcocks and snipes from their haunts in woods and marshes.

**COCK-FIGHTING**, an amusement practiced in various countries, first perhaps among the Greeks and Romans. At Athens there were annual cock-fights, and among the Romans quails and partridges were also used for this purpose.

**COCK'NEY**, a nickname for a London citizen, as to the origin of which there has been much dispute. The word is often, but not always, employed slightly as implying a peculiar limitation of taste or judgment. The epithet is as old at least as the time of Henry II.

**COCK OF THE PLAINS**, a large North American species of grouse, inhabiting desolate plains in the western states.

**COCK OF THE ROCK**, a South American bird of a rich orange color with a beautiful crest, belonging to the manakin family.

**COCKPIT**, in a man-of-war, the place where the wounded are dressed in battle or at other times, and where medicines are kept.

**COCK'ROACH**, a genus of insects, characterized by an oval, elongated, depressed body, which is smooth on its superior surface. They have parchment-like elytra, and in the female the wings are imperfectly developed. They are nocturnal in their habits, exceedingly agile, and devour provisions of all kinds. Cockroaches, like other orthopterous insects, do not undergo a complete metamorphosis: the larvæ and nymphs resemble the perfect insect, except that they have merely rudiments of wings. The eggs are carried below the abdomen of the female for seven or eight days till she finally attaches them to some solid body by means of a gummy fluid. The species are numerous.

**COCKSWAIN** (colloquially cok'sn), the officer who manages and steers a boat and has the command of the boat's crew.

**CO'COA**, a name given to the ground kernels of the cacao or chocolate tree prepared to be made into a beverage. See Cacao.

**CO'COA-NUT**, or **COCO-NUT**, a woody fruit of an oval shape, from 3 or 4 to 6 or 8 inches in length, covered with a fibrous husk, and lined internally with a white, firm, and fleshy kernel. The tree which produces the cocoa-nut is a palm, from 40 to 60 feet high. The trunk is straight and naked, and surmounted by a crown of feather-like leaves. The nuts hang from the summit of the tree in clusters of a dozen or more together. The external rind of the nuts has a smooth surface. This incloses an extremely fibrous substance, of considerable thickness, which immediately surrounds the nut. The latter has a thick and hard shell, with three black scars at one end, through one of which the embryo of the future tree pushes its way. This scar may be pierced with a pin; the others are as



hard as the rest of the shell. The kernel incloses a considerable quantity of sweet and watery liquid, of a whitish color, which has the name of milk. This palm is a native of Africa, the East and West Indies, and South America, and is now grown almost everywhere in tropical countries. Food, clothing, and the means of shelter and protection are all afforded by the cocoa-nut tree. The kernels are used as food in various modes of dressing, and yield on pressure an oil which is largely imported into various countries. When dried before the oil is expressed they are known as copra. The fibrous coat of the nut is made into the well-known cocoa-nut matting; the coarse yarn obtained from it is called coir, which is also used for cordage. The hard shell of the nut is polished and made into a cup or other domestic utensil. The fronds are wrought into baskets, brooms, mats, sacks, and many other useful articles; the trunks are made into boats or furnish timber for the construction of houses. By boring the tree a white sweetish liquor called toddy exudes from the wound, and yields by distillation one of the varieties of the spirit called arack. A kind of sugar called jaggery is also obtained from the juice by inspissation.

**COCOA-NUT OIL**, a solid vegetable fat, largely used in candle-making and in the manufacture of soaps and pomatum. This fat is got by pressure from the albumen of the cocoa-nut kernel, and is as white as lard, and somewhat firmer. Manila and Ceylon send large quantities of the oil to the U. S.

**COCOON**, the name given to the web or ball spun by caterpillars before passing into the chrysalis state. The valuable product thus obtained from the silkworm is well known.

**COD**, a genus of well-known soft-finned fishes, distinguished by the following characteristics:—A smooth, oblong, or fusiform body, covered with small soft scales; ventrals attached beneath the throat; gills large, seven-rayed, and opening laterally; a small beard at the tip of the lower jaw; generally two or three dorsal fins, one or two anal, and one distinct caudal fin. The most interesting species is the common or bank cod. Though found plentifully on the coasts of other northern regions, as Britain, Scandinavia, and Iceland, a stretch of sea near the coast of Newfoundland is the favorite annual resort of countless multitudes of cod, which visit the the Grand Banks to feed upon the crustaceous and molluscous animals abundant in such situations, and thus attract fleets of fishermen. Few members of the animal creation are more universally serviceable to man than the codfish. Both in its fresh state and when salted and dried it is a substantial and wholesome article of diet; the tongue is considered a delicacy, and the swimming-bladders or sounds, besides being highly nutritious, supply, if rightly prepared, an isinglass equal to the best Russian. The oil extracted by heat and pressure from the liver is of great medicinal value, and contributes considerably to the high economic value of the cod. The cod is enormously prolific,

the ovaries of each female containing more than 9,000,000 of eggs; but the numbers are kept down by a host of enemies. The spawning season, on the banks of Newfoundland, begins about the mouth of March and terminates in June; but the regular period of fishing does not commence before April on account of the storms, ice, and fogs. The season lasts till the end of June, when the cod commence their migrations. The average length of the common cod is about 2½ or 3 feet, and the weight between 30 and 50 lbs., though sometimes cod are caught weighing three times this. The color is a yellowish-gray on the back, spotted with yellowish and brown; the belly white or reddish, with golden spots in young individuals. It is caught by lines and hooks.

**COD**, Cape. See Cape Cod.

**CODE**, in jurisprudence, is a name given to a systematic collection or digest of laws. The following are the chief codes which have affected the laws of Europe and the United States: The Theodosian Code, a compilation executed in 429 by a commission on behalf of Theodosius the Younger, and promulgated as law throughout the eastern and western empires. The Justinian Code, a code compiled in 528, in the reign of the Emperor Justinian, incorporating all the codes, rescripts, edicts previously in use (see Civil Laws). The Code Napoléon, or Code Civil, undertaken under the consulship of Napoléon by the most eminent jurists of France, and published in 1804. The Code Napoléon (under which name other four codes of commercial law, criminal law, penal law, and law of procedure, drawn up at the same time, are often included) was a code in the strictest sense, that is, not merely a collection of laws, but a complete and exclusive statement of the law virtually amounting to a recasting of the laws of the country. Under the first empire the adoption of the Code Napoléon was made obligatory on all the countries subject to the French, and although it has been judged defective in some technical respects, its brevity, clearness, and modern spirit have made it popular in all the countries where it has been introduced. At present it is recognized in Belgium (with some modifications), in Baden, in Italy, and elsewhere in Europe.

**CODEINE** (kō-dē'-in), a crystallizable alkaloid obtained from opium, in which it exists to the amount of 6 or 8 ozs. per 100 lbs. It is used to produce sleep and to soothe irritable coughs; and is the chief remedy in diabetes; dose ¼ grain and upward. It is a poison in excessive doses.

**CODICIL**, in law, a supplement to a will, to be considered as a part of it, either for the purpose of explaining or altering or of adding to or subtracting from the testator's former disposition. A codicil may not only be written on the same paper or affixed to or folded up with the will, but may be written on a different paper and deposited in a different place. In general the law relating to codicils is the same as that relating to wills, and the same proofs of genuineness must be furnished by signature, and attestation by witnesses.

A man may make as many codicils as he pleases, and, if not contradictory, all are equally valid.

**COD-LIVER OIL**, an oil extracted from the livers of different kinds of cod. The finest and palest oil is got from fresh and carefully-cleaned liver, the oil being extracted either in the cold or by a gentle heat. The darker kinds are got at a higher temperature, and often from the livers in a putrefying state. Only the pale oils are used in medicine; the dark oils are too rank and acrid, and they are only used in dressing leather. Cod-liver oil is a somewhat complex substance, but the main ingredients appear to be olein and margarin. Acetic butyric, and other acids are also present, and to these the oil may owe some of its odor. This oil is now a recognized agent in the treatment of rheumatism, gout, scrofula, and especially of consumption, being taken internally and containing a quantity of easily-assimilated nutritive matter.

**CODY**, William Frederick (Buffalo Bill), an American scout, marksman and showman, born in Iowa in 1845. During the civil war he was a scout for the Union army and was subsequently a contractor for the supply of buffalo meat to the constructors of the Kansas Pacific Railroad, an enterprise which earned him his soubriquet. Of late years he originated his "Wild West Show," which took Europe by storm.

**CO-EDUCATION**, the education of the two sexes (1) in the same institution, and (2) in the same class room or laboratory. The practice is almost universal in the public schools and state colleges and universities, and in many of the large endowed colleges and universities. In Europe women are not admitted to the large schools except in England, Sweden, Switzerland and Austria. In this country co-education was advocated as early as 1826 by Horace Mann in the high schools of Massachusetts, and in 1833 Oberlin College opened its doors to women. Today virtually all the universities of the U. States and Canada (with the exception of a few religious institutions) admit women either as undergraduate students, graduate students, or both. The merits of the controversy as to the desirability of co-education is a very difficult question to decide.

**COFFEE** is the seed of an evergreen shrub which is cultivated in hot climates, and is a native of Abyssinia and of Arabia. This shrub is from 15 to 20 feet in height, and belongs to the Rubiaceæ. The leaves are green, glossy on the upper surface, and the flowers are white and sweet-scented. The fruit is of an oval shape, about the size of a cherry, and of a dark-red color when ripe. Each of these contains two cells, and each cell a single seed, which is the coffee as we see it before it undergoes the process of roasting. Great attention is paid to the culture of coffee in Arabia. The trees are raised from seed sown in nurseries and afterward planted out in moist and shady situations, on sloping grounds or at the foot of mountains. Care is taken to conduct little rills of water to their roots, which at certain seasons require to be constantly sur-



rounded with moisture. When the fruit has attained its maturity cloths are placed under the trees, and upon these the laborers shake it down. They afterward spread the berries on mats, and expose them to the sun to dry. The husk is then broken off by large and heavy rollers of wood or iron. When the coffee has been thus cleared of its husk it is again dried in the sun, and, lastly, winnowed with a large fan, for the purpose of clearing it from the pieces of husks with which it is intermingled. A pound of coffee is generally more than the produce of one tree; but a tree in great vigor will produce 3 or 4 lbs. Next in quality to the Mocha coffee may perhaps be ranked that of Southern India and that of Ceylon, which is strong and well flavored; but comparatively little coffee now comes from Ceylon.



Coffee plant.

Java and Central America produce large quantities of excellent coffee. Brazilian coffee, though produced more abundantly than any other, stands at the bottom of the list as regards quality. Liberian coffee may also be mentioned. Of the best Mocha coffee grown in the province of Yemen little or none is said to reach the western markets. Arabia itself, Syria, and Egypt consume fully two-thirds, and the remainder is exclusively absorbed by Turkish or Armenian buyers. The only other coffee which holds a first rank in eastern opinion is that of Abyssinia. Then comes the produce of India, which those accustomed to the Yemenite variety are said to consider hardly drinkable. American coffee holds in the judgment of all Orientals the very last rank.

**COFFER-DAM**, a temporary wooden inclosure formed in water in order to obtain a firm and dry foundation for bridges, piers, etc. It is usually formed of two or more rows of piles driven close together, with clay packed in between the rows.

**COFFIN**, the chest or box in which a dead body is inclosed for burial. Coffins were used by the ancients mostly to receive the bodies of persons of distinction. Among the Romans it was latterly the almost universal custom to consume the bodies with fire, and

deposit the ashes in urns. In Egypt coffins seem to have been used in ancient times universally. They were of stone, earthenware, glass, wood, etc. A sort of ancient coffin is known as a sarcophagus. Coffins among Christians were introduced with the custom of burying. (See Burial.) Modern coffins are usually made of wood, and are sometimes inclosed in a leaden case. It has been often proposed that they should be made with a hole opposite the place of the mouth of the body, so as to allow breathing in case of revival. Of course it would be necessary, at the same time, to let the coffin stand for some days in a convenient place, as is the custom in some parts of Germany. It has recently been proposed to employ coffins of wicker-work, while some strenuously advocate the burning of all dead bodies. See Cremation.

**COFFIN**, Charles Carleton, an American journalist and writer, born in New Hampshire in 1823, died in 1896. He was war correspondent during the civil war for the Boston Journal and later made a tour of the world. His published works deal largely with war and travel.

**COFFIN**, James Henry, an American mathematician and scientist, born in Massachusetts in 1806, died in 1873. He was one of the first scientists appointed to the Smithsonian Institution and his publications deal with meteorology, astronomy and psychology.

**COFFIN**, William Anderson, an American painter, born in Pennsylvania in 1855. His paintings are chiefly landscapes. His picture, Rain, was purchased by the Metropolitan Museum, and he was awarded a bronze medal at the Paris exposition of 1889.

**COGHLAN**, Rose, an Anglo-American actress, born in England in 1853. Her first appearance was as one of the witches in Macbeth. She made her American debut with E. A. Sothern in 1871 at New York, and since that time has appeared in Shakespearean and other parts in the principal American cities.

**COGNAC** (kon-yák), a town in France, dep. Charente, and near the river Charente, 22 miles w. Angoulême, pleasantly situated on a hill, crowned by the remains of an old castle. It is famous for the brandy which bears its name, and which is exported to all parts of the world. Pop. 18,932.

**COGNATES**, relations by the mother's side. See Agnates.

**COGNISANCE**, in heraldry, a crest, coat of arms, or similar badge of distinction appertaining to a person or family; in law, judicial or formal notice or acknowledgment of a fact.

**COGNOMEN**, the hereditary family name (such as Cicero, Cato, etc.) among the ancient Romans. The other two names generally borne by every well-born Roman, viz. the prænomen and nomen (as in Marcus Tullius Cicero) served to denote the individual (Marcus), and the gens (Tullius) or clan to which his family belonged.

**COGNOVIT**, in law, is a written confession given by the defendant that the action of the plaintiff is just, or that he has no available defense.

**COG-WHEEL**, a wheel with cogs or teeth.

**COHABITATION**, the living together of a man and woman as husband and wife. The term does not exclusively mean the very act of sexual intercourse itself, but implies it.

**COHESION**, the force by which the various particles of the same material are kept in contact, forming one continuous mass. Its action is seen in a solid mass of matter, the parts of which cohere with a certain force which resists any mechanical action that would tend to separate them. In different bodies it is exerted with different degrees of strength, and it is measured by the force necessary to pull them asunder. Cohesion acts at insensible distances, or between particles in contact, and is thus distinguished from the attraction of gravitation. It unites particles into a single mass, and that without producing any change of properties, and is thus distinguished from adhesion, which takes place between different masses or substances; and from chemical attraction or affinity, which unites particles of a different kind together and produces a new substance. Hardness, softness, tenacity, elasticity, malleability, and ductility are to be considered as modifications of cohesion. The great antagonist of cohesion is heat.

**COHESION FIGURES**, a class of figures produced by the attraction of liquids for other liquids or solids with which they are in contact, and divided into surface, submersion, breath, and electric cohesion figures. Thus a drop of an independent liquid, as oil or alcohol, will spread itself out on the surface of water always in a definite figure, but differing with each fluid dropped on the water. Breath figures are produced by putting a drop of the liquid to be examined on a slip of mica, and breathing on it, when each fluid takes a distinct characteristic shape. Electric cohesion figures are produced by electrifying drops of various liquids placed on a plate of glass.

**COHOBATION**, the repeated distillation of the same liquid from the same materials.

**COHOES** (ko-hoz'), a city of Albany Co., New York, on the west bank of the Hudson River, at the mouth of the Mohawk, with unlimited water-power derived from the Mohawk Falls. There are large cotton and other mills. Pop. 26,140.

**COIMBATORE** (ko-im-ba-tôr'), a town of Hindustan, Madras Presidency, capital of district to which it gives name, situated on the river Noyil, with wide streets, abundant water, and a healthy climate. Pop. 53,080.—The district has an area of 7860 square miles. It is fertile, producing sugar, cotton, rice, and tobacco; and well watered by several rivers. Pop. 2,202,312.

**COINAGE**, Coins. See Coining, Money, Numismatics, Currency.

**COINAGE**, the conversion of a metal into pieces of money, (coins) stamped with impressions which are provided for by law. The right to coin money is a prerogative of the State and one of the foremost marks of sovereignty. The circulation of coins rests, in the first



instance, upon the authority of the State, but that authority must be exercised in good faith. Coinage issued by individuals would lack authority and lack also the guaranty of good faith. There have been occasions of great dearth of money where private persons have issued coins. Such issues are known as tokens, and gain circulation either from their similarity to legal coins or from the promise of redeeming them. Their total lack of uniformity gives a picture of what might be expected were the issue of coins left wholly to private initiative. Almost equally obvious is the necessity for the manufacture by the State of the coins which it issues. To delegate the manufacture of its coins to a private establishment, as was done in France before 1879, required such a minute control of all its operations by State officials that the plan has generally been abandoned. The greater integrity of a national mint over a private enterprise is further illustrated by the fact that the mints of the leading nations are frequently called upon to execute the coinage for smaller States which have no mints of their own. Thus, in 1901, the United States Mint executed a gold coinage for Costa Rica.

In many countries, notably England and the United States, the government makes no charge for coining gold (free coinage) and in others a charge is made, called seignorage, the term being derived from the feudal system of France. Perfectly free coinage has been found to be most advantageous to the general welfare of a nation.

**COKE**, the carbonaceous residue of coal which has been heated in an oven or retort, or in any way by which little air is admitted, until all volatile matter has been expelled. The simplest method of producing coke is based on the preparation of wood charcoal, the coal being arranged in heaps which are smothered with clay or coal-dust, and then set on fire, sufficient air being admitted to keep the mass at the proper temperature for decomposition without wasting the coke. After the volatile portions are got rid of, the heap is allowed to cool, or is extinguished with water, and the coke is then ready. Methods of heating the coal in close or open ovens until the gaseous and fluid products are driven off are also commonly used. Gas-coke is that which remains in the retorts after the gas has been given off. Good oven-coke has an iron-gray color, sub-metallic luster, is hard, and somewhat vesicular; but gas-coke has rather a slagged and eindery look, and is more porous. Coke contains about 90 per cent of carbon, and is used where a strong heat is wanted without smoke and flame, and it is accordingly largely consumed in drying malt and similar purposes. It used to be burned regularly in locomotive-engines, but raw coal is now commonly substituted. The largest quantities are consumed in smelting operations.

**COKE**, Sir Edward, an eminent English lawyer, was the son of a Norfolkshire gentleman and was born in 1551. He died, September, 1634. His principal works are Reports, from 1600 to 1615; Institutes of the Laws of England, in

four parts; the first of which contains the celebrated commentary on Littleton's Tenures ("Coke Upon Littleton"); A Treatise of Bail and Mainprise, Complete Copyholder.



Sir Edward Coke.

**COLBERT** (kol-bār), Jean Baptiste, a celebrated French minister of finances, born at Rheims in 1619. After serving in various subordinate departments Colbert was made intendant, and at length comptroller-general of the finances. His task was a difficult one. He found disorder and corruption everywhere. The state was the prey of the farmers-general, and at the same time maintained only by their aid. The people were obliged to pay 90,000,000 livres of taxes, of which the king received scarcely 35,000,000, the revenues were anticipated for two years, and the treasury empty. Colbert at once commenced a system of stringent reforms, abolishing useless offices, retracting burdensome privileges, diminishing salaries, and distributing and collecting the taxes by improved methods till he had reduced them almost to one-half. To his talents, activity, and enlarged views the development and rapid progress of industry and commerce in France was largely due. He constructed the Canal of Languedoc; declared Marseilles and Dunkirk free ports; granted premiums on goods exported and imported; regulated the tolls; established insurance offices; made uniform laws for the regulation of commerce, labored to render the pursuit of it well esteemed, and invited the nobility to engage in it. The French colonies in Canada, Martinique, etc., showed new signs of life; new colonies were established in Cayenne and Madagascar, and to support these Colbert created a considerable naval force. Under the protection and in the house of the minister (1663) the Academy of Inscriptions was founded. Three years afterward he founded the Academy of Sciences, and in 1671 the Academy of Architecture. He enlarged the Royal Library and the Garden of Plants, and built an observatory, in which he employed Huyghens and Cassini. He began the measurement of the meridian in France, and sent men of science to Cayenne. After having conferred the greatest benefits on his country he died in 1683, out of favor with the king and the people.

**COLD**, the absence of sensible heat, especially such a want of heat as causes

some discomfort or uneasiness. The temperature in which man and other animals live is generally below the natural heat of the body, but this is easily kept up in ordinary cases by means of the food taken in and digested. A high degree of cold, however, produces bodily depression, and is a frequent source of disease, or even of death. For the ailment called a cold, see Catarrh.

**COLD-BLOODED ANIMALS**, a term applied to those animals, such as reptiles, the temperature of whose blood ranges from the freezing-point, or near it, to 90° Fahr., in accordance with that of the surrounding medium.

**COLD CREAM**, a cooling ointment prepared in various ways. A good variety may be made by heating four parts of olive-oil with one of white wax. This ointment cools the skin, rendering it soft and pliable, and is successfully applied for the cure of chapped hands.

**COLD-WATER CURE**. See Hydropathy.

**COLD WAVE**, a term used by the United States weather bureau and applied to sudden changes in temperature. Cold waves are caused by the pressure of the heavy cold air of the north or northwest upon the lighter warm air of the Southern and Eastern parts of the United States. They advance with an even front causing the temperature to drop from a few degrees to 40 or 50 degrees in a few hours.

**COLE**, Timothy, an American engraver, born in England in 1852 and known as the engraver of numerous fine pictures published by the Century company of New York. Many cities consider Mr. Cole the best of modern engravers.

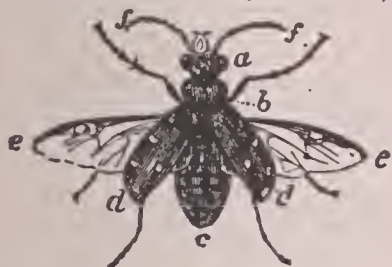
**COLEMAN**, William Tell, an American pioneer, one of the 49'ers who went to California with the prospectors on the discovery of gold in that state. He was conspicuous as a leader of early vigilance committees. Coleman was born in Kentucky in 1824 and died in 1893.

**COLENSO**, John William, D.D., Bishop of Natal, born in 1814; educated at Cambridge; assistant-master at Harrow till 1842; appointed in 1853 first bishop of Natal, South Africa. He published treatises on Algebra and Arithmetic which have been popular text-books in schools and colleges. His work on the Pentateuch and Book of Joshua, which called in question the historical accuracy of these books, involved the author in a conflict with his ecclesiastical superiors, and he was deposed by the Bishop of Cape Town. But the decisions of the privy-council of chancery were in his favor, and he continued to officiate as bishop. He died in 1883.

**COLEOP'TERA**, an order of insects, commonly known as beetles. They have four wings, of which the two superior are not suited to flight, but form a covering and protection to the two inferior, and are of a hard and horny or parchment-like nature. The inferior wings, when not in use, are folded transversely under the superior. The coleoptera undergo a perfect metamorphosis. The larva generally resembles a short thick worm with six legs and a scaly head and mouth.



**COLERIDGE**, Samuel Taylor, a celebrated English poet and philosopher, was born on 21st October, 1772, at Ottery St. Mary, Devonshire. He died July 25th, 1834. The dreamy and transcendental character of Coleridge's poetry eminently exhibits the man. In his best moments he has a fine sublimity of thought and expression not surpassed by Milton; but he is often turgid and verbose. As a critic, especially of Shakespeare, Coleridge's work is of the highest rank, combining a comprehensive grasp of large critical principles and a singularly subtle insight into details. Coleridge's poetical works include *The Ancient Mariner*, *Christabel* (incomplete), *Remorse*, a tragedy, *Kubla Khan*, a translation of Schiller's *Wallenstein*, etc.; his prose works, *Biographia Literaria*, *The Friend*, *The Statesman's Manual*, *Aids to Reflection*, *On the Constitution of Church and State*, etc. Posthumously were published specimens of his *Table Talk*, *Literary Remains*, etc.



One of the coleoptera.

a, Head. b, Thorax. c, Abdomen. dd, Elytra. ee, Wings. ff, Antennae.

**COLFAX**, Schuyler, an American statesman, born in New York City in 1823, died in 1885. In 1836 he settled in Indiana and started the *South Bend Register*. After serving seven terms in congress he was speaker for six years till 1869, he was elected Vice-President of the United States in the last mentioned year.

**COLGATE**, James Boorman, an American banker, born in New York City in 1818. He was conspicuous during the panic of 1873 for his large loans to the government.

**COLGATE**, Samuel, an American philanthropist and capitalist, born in New York City in 1822, died in 1897. He was famous as a manufacturer of soaps and for his liberal distribution to religion and education of a part of the fortune he made in his business. In honor of him the name of Madison University was changed in 1889 to Colgate University.

**COLGATE UNIVERSITY**, founded at Hamilton, N. Y., in 1818 by the Baptist Education Society. In 1846 it was incorporated as Madison University, and its name was changed in 1889 to Colgate University in honor of Samuel Colgate, its greatest benefactor. The University has a property of \$2,160,000, a library of 35,000 volumes, and a registration of 300 students. A Baptist divinity school forms part of the institution.

**COL'IC**, a painful disorder of the bowels, usually of a spasmodic character, unaccompanied by diarrhoea, and presenting itself in various forms. When the pain is accompanied with a vomiting of bile or with obstinate costiveness

it is called a bilious colic; if with windy distension, it takes the name of flatulent or windy colic; if with heat and inflammation, it takes the name of inflammatory colic, or enteritis. There are many other varieties of this complaint, some of which are peculiar to certain occupations or districts, as the painters' colic (see Lead Poisoning), the Devonshire colic.

**COLIGNY** (kol-in-yē), Gaspard de, French admiral, born in 1517, distinguished himself under Francis I. and Henry II., who made him in 1552 Admiral of France. After the death of Henry II., Coligny took the Protestant side in the religious strifes of the time, and became the head of the Huguenot party. He was generally unfortunate in the battles he fought, but speedily repaired his defeats by prudence and good management. When peace was made Coligny was received with apparent favor at court. But this was only a blind; and on the night of St. Bartholomew's (Aug. 24, 1572) Coligny was basely slaughtered, and his corpse given up to the outrages of the mob.

**COLLAT'ERAL RELATIONS**, descendants of brothers or sisters, or the brothers or sisters of the ascending lines.

**COLLATERAL SECURITY**, additional security, such as a deed granted over other property besides that already mortgaged.

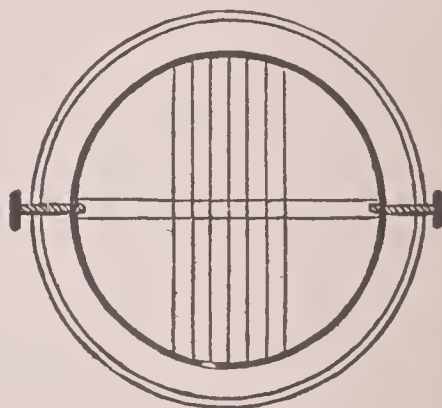
**COLLATION**, a comparison of one copy or thing of a like kind with another, especially manuscripts and editions of books.—In canon law, the presentation of a clergyman to a benefice by a bishop who has the right of patronage. In such a case the combination of the act of presentation and institution constitute collation.

**COL'LEGE**, in a general sense, a body or society of persons invested with certain powers and rights, performing certain duties, or engaged in some common employment or pursuit. In the U. States and Great Britain some societies of physicians are called colleges. So, also, there are colleges of surgeons, a college of heralds, etc. The most familiar application of the term college, however, is to a society of persons engaged in the pursuits of literature, including the professors, lecturers, or other officers, and the students. As applied to an educational institution the name is somewhat loosely used. The higher class of colleges are those in which the students engage in study for the purpose of taking a degree in arts, medicine, or other subjects, and are connected with, or have more or less the character of universities. The early history of these institutions is somewhat obscure; the probability is that they were originally founded in the various universities of the middle ages, with similar objects and from the same charitable motives. Hostels or boarding-houses were provided (principally by the religious orders, for the benefit of those of their own fraternity), in which the scholars lived under a certain superintendence, and the endowment of these hostels by charitable persons for the support of poor scholars completed the foundation of a college. Out of this

has developed the modern English college as seen at Oxford and Cambridge, where each college, though a member or component part of the university, is a separate establishment whose fellows, tutors, and students live together under a particular head, called master, principal, warden, etc., of the college. In Scotland, the U. States, and Germany the college is practically one with the university, the latter body performing all the functions alike, of teaching, examining, degree-conferring, etc. See Universities.

**COLLIE**, a variety of dog especially common in Scotland, and from its intelligence of much use to shepherds. It is of medium size and varies much in coloring, black and white being common, and black with tan-colored legs, muzzle, etc., being highly esteemed. The head is somewhat fox-shaped, the ears erect, but with drooping points, the tail rather long, bushy, and with a strong curl.

**COLLIMATION**, Line of, in an astronomical instrument, such as a telescope or transit instrument, the straight line which passes through the center of the object-glass and intersects at right



Collimation.

angles a system of spider-threads placed at the focus of the eye-piece. The proper adjustment of the line of collimation of the instrument is necessary to accurate observation of the time at which movements of the heavenly bodies take place.

**COLLIMATORS**, two small subsidiary telescopes used for collimating astronomical instruments, that is, for adjusting the line of collimation, and for determining the collimation error.

**COLLINS**, William Wilkie, born in London in 1824. He was educated for the bar, but turned aside to literature, in which he has specially distinguished himself as a novelist of great dramatic and constructive power. Among his best-known works are *Antonina*, *The Woman in White*, *The New Magdalen*, *The Evil Genius*, etc. He died in 1889.

**COLLISION**, in maritime affairs, the shock of two ships coming into violent contact, whereby one or both may suffer more or less injury. Collision may happen without blame being imputable to either party, as where the loss is occasioned by a storm, in which case the misfortune must be borne by the party on whom it happens to light. Or a collision may arise where both parties are to blame—where there has been a want



of due diligence or skill on both sides; in which case neither party has an action against the other. Thirdly, it may happen by the misconduct of the suffering party only, and then the rule is that the sufferer must bear his own burden. Lastly, it may have been the fault of the ship which ran the other down; and in that case the injured party would be entitled to an entire compensation from the other. Strict laws and regulations to prevent collisions have been laid down, which contain rules concerning lights, and sailing and steering rules. By the rule of the road at sea, if two sailing ships are approaching each other end on, or nearly so, the helms of both must be put to port, so that each may pass on the port side of the other; in crossing so as to involve risk of collision the sailing ship with the wind on the port side shall keep out of the way of the ship with the wind on the starboard, but if they have both the wind on the same side the ship which is to windward shall keep out of the way of the one that has it to leeward. If a steam ship and a sailing ship are approaching, so as to involve collision the former must keep out of the way of the latter. If one vessel is overtaking another she must keep out of the way of the last-named vessel.

**COLLO'DION**, a substance prepared by dissolving pyroxiline (gun-cotton) in ether, or in a mixture of ether and alcohol, which forms a useful substitute for adhesive plaster in the case of slight wounds. When the fluid solution is applied to the cut or wound it immediately dries into a semi-transparent, tenacious film, which adheres firmly to the part, and under it the wound or abrasion heals without inflammation. In a slightly modified form collodion is also employed as the basis of a photographic process called the collodion process. See Photography.

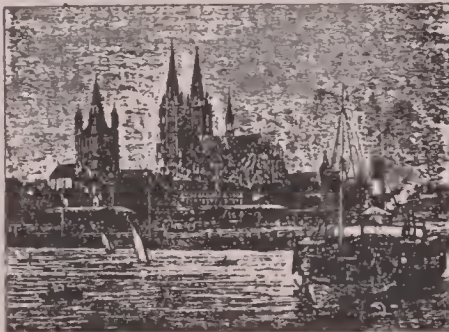
**COL'LOIDS**, non-crystallizable substances, such as gelatine, gum, etc. See Dialysis.

**COLLÔT D'HERBOIS** (kol-ô-dâr-bwä), Jean Marie, French revolutionary, born in 1750. On the outbreak of the revolution he soon became prominent as a leader of the Mountain or extreme party. After filling several missions he was sent by Robespierre along with Fouché to Lyons in 1793, with almost unlimited powers, and was guilty of the most flagrant enormities. Returning to Paris he became a determined opponent of Robespierre, and being chosen president of the Convention (19th July, 1794), contributed to his fall. A few weeks after he was banished to Cayenne, where he died in 1796.

**COLLU'SION**, in law, a secret agreement between opposing litigants to obtain a particular judicial decision on a preconceived statement of facts, whether true or false, to the injury of a third party. Collusion, when proved to exist, nullifies the judgment obtained through it.

**COLOGNE** (ko-lôn'), German, Köln (keuln), a city of Rhenish Prussia, on the left bank of the Rhine, forming, in connection with Deutz, which serves as a tête-du-pont on the opposite side of the river (across which is a bridge of boats

and an iron railway and general traffic bridge), a fortress of the first rank. The old fortifications, dating from the middle ages, are being, or have been recently, swept away, new works being constructed in accordance with the principles of modern fortification. There are many fine old buildings as well as excellent modern ones; the churches in particular are interesting. The most important edifice of all is the cathedral, begun in 1248, one of the finest and largest Gothic



Cologne, showing cathedral and church of St. Martin.

structures in Europe. It was only completed in the 19th century, there being expended on it in 1828-84 over \$5,000,000. It is in the form of a cross; its entire length is about 445 feet; breadth, 200 ft.; height to ridge of roof, 202 ft., height of the two western towers, between which is a grand portal, 520 feet, being thus among the highest edifices in the world. The council-house, museum, and the great St. Martin Church with its imposing tower should also be mentioned. The manufactures embrace sugar, tobacco, glue, carpets, leather, machinery, chemicals, pianos, and the celebrated eau de Cologne. The trade by river and railway is very great.—It was annexed to the German Empire in 870, and became one of the most powerful and wealthy cities of the Hanseatic League, but latterly it declined. In 1792 it ceased to be a free city. It was taken by the French in 1794, ceded to them by the Treaty of Lunéville in 1801, and restored to Prussia in 1814. Pop. 372,229.

**COLOM'BIA**, Republic of, formerly called New Granada, a republic of South America, consisting of the eight departments or states of Antioquia, Bolivar, Boyaca, Cauca, Cundinamarca, Magdalena, Santander, and Tolima. The population is now about 3,593,600. The chief towns are Bogota, the capital, Medellin, Barranquilla, Cartagena, and Bucaramanga. The area is estimated officially at 473,202 sq. miles, but there is much disputed boundary territory in the inland regions toward the south and east. Late in 1903 the department of Panama proclaimed itself an independent republic, and was at once recognized by the U. States, which has concluded with it an agreement for the construction of a canal across the isthmus. The flora is rich and luxuriant. A great part of the country is still covered with virgin forests, which yield excellent building-wood, Peruvian bark, caoutchouc, vanilla, etc. The fauna includes the jaguar, puma, tapir, arma-

dillo, sloth, various species of deer, and the gigantic condor. The mineral wealth is various and abundant, though still imperfectly explored. It comprises coal, gold, silver (both now largely worked by foreign companies), emeralds, and salt. Industry is at a very low stage. Maize, bananas, and plantains are the chief articles of food. Tobacco and coffee are cultivated and exported. Sugar is also grown. Manufactures can scarcely be said to exist, Panama hats, mats, and coarse cotton cloths being almost the only articles that can be mentioned in this class. The chief ports are Sabanilla, the port of Barranquilla and Cartagena. The loss of the Isthmus of Panama has deprived Colombia of much of its commercial importance. The foreign trade of the country is chiefly with Britain and the United States. The exports are chiefly precious metals, hides, coffee, tobacco, etc.; the imports, manufactured goods.—By the constitution, as amended in 1886, the executive power is vested in a president elected for six years, the legislative power in a congress of two houses—the Senate and the House of Representatives. The former consists of twenty-four representatives, three from each department, the latter of representatives elected by universal suffrage for four years, one for every 50,000 inhabitants. The revenue is generally under the expenditure and the finances are in an unsatisfactory state. New Granada was discovered by Alonso de Ojeda in 1499; it was visited by Columbus on his fourth voyage, in 1502. The first Spanish settlement was made in 1510 at Santa Maria in the Gulf of Darien, and the whole country was formed into a province under a captain-general in 1547. New Granada declared its independence of Spain in 1811, and after eleven years of warfare succeeded with the help of Venezuela in effecting its liberation. Both states then united with Ecuador, also freed from the Spanish domination, to form the first republic of Colombia; but internal dissensions arising, the three states again separated in 1831, forming three independent republics, which have had a very troubled existence. In 1861 the states forming New Granada by agreement adopted a new constitution, the republic henceforth to be called the United States of Colombia. This title was retained till, by the new constitution adopted in 1886, the state ceased to be a federal republic and became a unitary republic, with the name of Republic of Colombia. The secession of Panama in 1903 was partly brought about by the dilatoriness of the central government in concluding a satisfactory arrangement with the United States in regard to the construction of an interoceanic canal.

**COLOM'BO**, a seaport town, the capital of Ceylon, on the south west coast, and about 70 miles west by south of Kandy, with which it is connected by railway. Pop. 158,093.

**CO'LOM**, the middle portion of the large intestine, or that which lies between the cæcum and the rectum, or terminal portion. In man it is about 4½ feet long, and forms a series of



pouches in which the digested food is for a time detained. It is itself believed to have some digestive power.

**CO'LO'N**, a punctuation mark, thus: used to mark a pause in the sense that might also be indicated by a full stop.

**COLON'**, or **ASPINWALL** (the former is the official name), a free port of Panama, on Manzanillo Island, on the north side of the Isthmus of Panama, at the Atlantic extremity of the inter-oceanic railway, and near that of the Panama Canal. Established in connection with the railway, it had an important transit trade before the canal was begun, and since then the place has been entirely transformed, a new town with wide and regular streets having been built on a tract of land reclaimed by the builders of the canal. There is extensive harbor accommodation. Pop. estimated at 8,000 to 10,000.

**COLONEL** (kēr'nel), a military title indicative of a rank under that of brigadier general. In the United States army a colonel commands a regiment. In England and Europe generally the title has more an honorary than an actual value.

**COLONIAL DAMES OF AMERICA**, national society of, an organization of women patriots, founded in 1890, membership in which is limited to women lineally descended from an ancestor of distinction who resided in the colonies previously to 1776. Its purpose is the collection of interesting documents relative to colonial and revolutionary affairs.

**COLONIAL DAMES OF AMERICA**, a patriotic society of women organized in 1892 for the purpose of preserving records, manuscripts, etc., pertaining to the colonies. Membership is conditioned on being descended from a worthy ancestor settling in the colonies previously to 1750. It has a membership of 5,000 and is distinct from the other society of the same name.

**COLON'NA**, an Italian family that had become important as early as the 8th century. Its fame during the middle ages eclipsed that of every other Roman family except the great rival house of the Orsini. The Colonna family is at present represented by several branches, the Colonna-Sciarra, Colonna-Stigliano, etc. It played an important part in the affairs of Europe, became allied to the greatest houses of Italy, Spain, and Germany, and has furnished many celebrated warriors, popes, and cardinals.

**COLON'NA**, Vittoria, the most renowned poetess of Italy, was born in 1490. At the age of seventeen she was married to Ferdinand, Marquis of Pescara, the companion of her youth, who became one of the distinguished men of his age. All her poems were devoted to the memory of her husband. She died at Rome in 1547. Her most celebrated work is the *Rime Spirituali*, 1538. They are considered among the happiest imitations of Petrarcha.

**COLONNADE'**, in architecture, any series or range of columns placed at certain intervals from each other. When surrounding the building on the exterior the colonnade is called a peristyle; when projecting beyond the line of the building it is called a portico.

**COL'ONY**, a settlement formed in one country by the inhabitants of another. Colonies may either be formed in dependence on the mother country or in independence. In the latter case the name of colony is retained only in a historical sense. Properly, perhaps, the term should be limited to a settlement which carries on a direct cultivation of the soil, as in the Dominion of Canada or Australia; such settlements as those of the British in Hindustan or Malta being the mere superposition on the natives of a ruling race which takes little or no part in the general industry of the country. The motives which lead to the formation of colonies, and the manner of their formation, are various. Sometimes the ambition of extending territory and the desire of increasing wealth have been the chief impulses in colonization; but colonies may now be said to have become a necessity for the redundant population of European states. Among ancient nations the principal promoters of colonization were the Phœnicians, the Greeks, and the Romans; the greatest colonizers in modern times have been the English and the Spaniards, next to whom may be reckoned the Portuguese, the Dutch, and the French.

The Germans have colonized parts of South America and Africa, and since the war with Spain the United States, by the acquisition of Porto Rico and the Philippine Islands have become one of the colonial powers of the world.

**COLOR**, the sensation in the brain produced by different rates of vibration of light waves which stimulate the retina and give rise to chemical changes therein which when reaching the brain are interpreted in a change of consciousness; also the pigment used in art to produce the sensation. Different lengths in the light waves produce different colors. For example, when the light-wave is  $\frac{7}{8}$  of an inch long, red is the color produced, and as the waves decrease in force, we see yellow, green, blue, and so on, through the spectrum. According to the theory of Chevreuil, now generally accepted, white light is the union of all colors, and its decomposition by an object reveals the color separated from the rest. Thus, a rose absorbs all colors but red, which it reflects; while a white substance, rejecting all colors, is therefore colorless. Correctly speaking, there are but six colors—three primary (red, blue, and yellow), and three secondary (orange, violet, and green). Orange is composed of purple and yellow, violet of red and blue, green of yellow and blue. All other colors are compounds of these.

Complementary Colors are those which, combined with another color or colors, make up the three primary colors constituting white light. If the given color be primitive, its complement is composed of the other two primitive colors. For example, the complementary color of blue is orange—that is to say, red and yellow. If the given color be a secondary, its complementary is the remaining primitive color—as, for instance, the comple-

mentary color of green (blue and yellow) is red. In painting, brilliancy of coloring may be obtained by placing complementary colors side by side, because each lends to the other a favorable halo, while the juxtaposition of non-complementary colors has the opposite effect of dullness. This method of heightening and softening colors was used with great effect by Delacroix, and is today much practiced by French and Spanish painters.

The fact that color is really a sensation in the brain, rather than a quality of the thing that is colored, is proved by the strange power which many people have of being able to hear colors. Statistics go to show that one person in every eight can hear colors; that is to say, one person in every eight, when looking at certain vivid colors, can hear peculiar sounds. On the other hand many persons, on hearing certain musical sounds, can see certain colors; sound on the one hand, producing color sensations, color on the other, producing sound sensations. These interesting facts are easily understood when we remember that in the brain there are different receiving centers for the various senses—sight, hearing, taste, smell—and a vast area of the brain used in the coordination of these sensations. Slight derangements of the cerebral machinery might well be imagined to cause a mixing of the functions of these coordinating parts and thus produce the phenomena mentioned. A Swiss boy was discovered recently who could taste, see, and smell sounds, see and hear odors, and so on. The problem is one of the most interesting in the physiology of the brain.

**COLORADO**, (kol-o-rá'dō) one of the United States of America, situated in the central belt of states in the Rocky Mountains, between lat. 37° and 41° N., and lon. 102° and 109° W., and containing



Colorado seal.

an area of 103,645 sq. miles, being sixth in size among the states. It is bounded on the north by Wyoming and Nebraska; east by Nebraska and Kansas; south by Oklahoma and New Mexico, and west by Utah. Its form is that of a perfect parallelogram, and it is the only state whose lines are so defined. It is traversed from north to south by the main range of the Rocky Mountains. The plains of Kansas, Nebraska and Colorado were, in passed ages, covered



## COLORADO

by a great paleozoic ocean, and are now filled with fossil remains of fishes, reptiles and animals. They rise gradually from the Missouri river to the base of the great Rocky chain. This broad and comparatively level expanse is destitute of timber, excepting a fringe of cottonwoods on the borders of the streams, but is covered with short nutritious grasses.

The plains east of the mountains constitute about one-third of the total area. Among the elevated ranges are four large natural parks—the North, South, Middle, and San Luis, which form distinct, picturesque and beautiful features of the mountain system and are watered by numerous streams and covered with verdure. Thousands of square miles are covered by forests, chiefly yellow and white pine and spruce. None of the harder woods, except a few clusters of scrub oaks, worthless for anything but fuel, exist in Colorado. Four-fifths of the state has an elevation of 4,000 to 10,000 feet above the sea. The lowest on the eastern border is 3,703 feet, and on the western, 4,435. The mountain parks are 8,000 to 9,500 feet above tide water. The summit of the main range averages 11,000 feet. Seventy-two peaks from which the snow never disappears, rise to heights between 13,500 and 14,500 feet. The loftiest of these is the Sierra Blanca, a part of the chain enclosing the San Luis park, 14,483 feet high. Among the others being Pikes Peak and Longs Peak.

The geographical center of Colorado is at a point three miles north-northeast of Spinney Station, on the Colorado Midland railway, in Park county.

The climate of Colorado is remarkably healthful. The air is dry, clear, and well adapted to the cure of diseases of the lungs and throat. The annual range of temperature is much less than in other sections of the country. In the various parts it is about 60° F., and the highest temperature does not exceed 80° nor the lowest 20° below. Health resorts are numerous in the mountain regions and there are also mineral and thermal springs. The mean temperature at Denver is 50°.

The soil is fruitful and the climate is well adapted to the growth of cereals. There is a large supply of native grass in Colorado, and this furnishes pasture for the large herds of cattle and sheep. Vegetables of all kinds and many fruits are successfully grown. The soil of the greater part of the state is very fruitful where it can have sufficient moisture. Irrigation is used to a great extent, and in such regions, wheat, corn, barley, oats, hay, and potatoes are staple products. Cattle and sheep raising are important industries.

The chief industry of the state is mining, and in its yield of gold and silver it is the leading state of the Union. Nearly every known mineral is found within the state. There are thousands of mines which produce lodes of silver and gold. There are also large deposits of lead ores, and the state produces about 45 per cent of the entire lead output of the whole country. One of the richest gold fields in the world was opened up in the Cripple Creek district

in 1896. In various parts of the state are iron mines. There are large supplies of copper, zinc, cement, silica, gypsum, onyx, and several valuable clays. There are many veins of anthracite and bituminous coal.

The principal manufacturing industries are in connection with the mineral products of the state; they are brass works, lead works, machine shops, foundries, iron works, building materials, tin, copper works, flouring mills, and furniture.

Colorado has a state university, agricultural college, school of mines, state normal school, all of which are sustained by legislative appropriations. Other institutions of learning are Colorado College, University of Denver, Westminster University of Colorado, Presbyterian College of the Southwest.

Colorado was a part of the immense Territory of Louisiana ceded to the United States by Napoleon Bonaparte in 1803. The first explorations were made by Spaniards from Mexico in 1540-42, the first of which, under Francisco Vasquez di Coronado, found in New Mexico near the southern border of Colorado a peculiar race of people dwelling in towns built of stone and adobe, and far superior in intelligence to the savage tribes of nomads. The southwestern part of the state is strewn with the ruins of these people, who were of Aztec or Toltec origin, probably the former, ancestors or contemporaries of the vast horde which swept down into Anahuac, overthrew the Toltecs and occupied their lands. Several other expeditions came up from the south in later times, and some of them penetrated the plains as far east as the Missouri river. The remnant of Hernando De Soto's army, after the death of the conqueror of Florida, came west to the Rocky mountains, but did not explore them. A Spanish cavalier, Don Juan de Oñate, passed up the Rio Grande river into the San Luis park in 1595, and discovered gold and silver there. Several French expeditions from New Orleans penetrated far out upon the plains toward the mountains, the first in 1712, others from the same source occurred in 1741.

The first regularly organized American exploration of the Rocky mountains occurred in 1806. It was conducted by Lieut. Zebulon M. Pike, whose report contained the first authentic record of the extent and value of the region. The second was by Maj. Stephen S. Long in 1820. In 1842 John C. Fremont began a series of five explorations, which developed practicable routes for the Pacific railways, and led ultimately to the construction of the Union Pacific railway from the Missouri river to San Francisco. The Territory of Colorado was organized by act of congress approved February 28, 1861, and Maj. William Gilpin was appointed governor. It was admitted into the Union as a State, August 1, 1876. From 1876 to 1888 Colorado was republican in national politics, but in the three presidential elections after 1888 the silver interests of the State made it decidedly democratic. In 1896 and 1900 especially, the democrats, populists, and Silver republicans,

in fusion, controlled a large proportion of votes in the State. In 1904 and 1908 the state was carried by the republicans.

Colorado is the most populous of the Rocky Mountain States. The following gives the population by decades: 1860, 34,277; 1870, 39,864; 1880, 194,327; 1890, 412,198; 1900, 539,700, of which only 10,654 were colored; 1908, 800,000.

**COLORADO**, a name of two rivers of the United States.—(1) The Western Colorado, or Rio Colorado, formed by the junction of the Green and Grand Rivers, at about lat. 38° n.; lon. 110° w., in Utah. It flows southwest and south through Arizona, and between Arizona and Nevada and California, and after a total course, including Green River, of about 1200 miles, falls into the Gulf of California. Among the most wonderful natural objects in North America is the Big Cañon of the Colorado, between lon. 112° and 115° w. Here the river flows between walls of rock which are nearly vertical, and are in some places 6000 feet high. This cañon is more than 300 miles long. (2) A river in Texas which rises in the northwest part of the State, flows generally southeast, and after a course of about 900 miles falls into the Gulf of Mexico at the town of Matagorda.

**COLORADO BEETLE**, an American species of beetle, nearly half an inch in length, almost oval, of a yellowish color marked with black spots and blotches, and on the elytra with ten black longitudinal stripes. The wings, which are folded under the elytra, are of a blood-red color. It is a native of the eastern slopes of the Rocky Mountains, and works great havoc among the potato crops.

**COLORADO COLLEGE**, an endowed institution at Colorado Springs, founded in 1874. It has a library of 35,000 volumes, has about 700 students and \$450,000 productive funds.

**COLORADO DESERT**, a region in southern California, considerably below the level of the sea, and consisting of arid, sandy wastes.

**COLORADO SPRINGS**, a thriving town of El Paso County, Colo., noted for the salubrity of its climate and its fine mineral springs. Pop. 25,000.

**COLORADO STATE AGRICULTURAL COLLEGE**, a school of agriculture at Fort Collins, Colo., founded in 1876. It has an attendance of 400 and a library of 15,000 volumes.

**COLORADO, UNIVERSITY OF**, the state university of Colorado at Boulder, Colo., founded in 1861 and opened in 1877. It is a complete university with medical and law schools, and offers full courses in the arts and the sciences. It has a library of 25,000 volumes, and a registration of above 500 students.

**COLOR-BLINDNESS**, total or partial incapability of distinguishing colors. Color-blindness has been divided into three grades: (a) Inability to discern any color, so that light and shade, or black and white, are the only variations perceived. (b) Inability to distinguish the nicer shades of the more composite colors, as browns, grays, and neutral tints. (c) Inability to distinguish be-

## COLOR-BLINDNESS



tween the primary colors, red, blue, and yellow, or between them and their secondaries, green, purple, orange, and brown. Red is the color which the color-blind are most commonly unable to distinguish, while yellow is the most easily recognized. Color-blindness occurs in eyes whose power of vision, as to form and distance, is quite perfect, and may exist unknown to the person affected by it. This defect is common especially among men. The cause of it in almost every case which has been carefully investigated has been found to be seated in the sensorium, not in the visual apparatus. It will be easily understood that those whose eyesight is thus defective are disqualified for holding various positions.

**COLORIMETER**, an instrument for measuring the depth of color in a liquid by comparison with a standard liquid of the same tint.

**COLOR PHOTOGRAPHY**, photography which will reproduce the colors of the thing, scene, or person photographed. Experiments have been made for years to succeed in accomplishing this much-to-be desired purpose, but thus far without avail. Experiments have been made upon a suggestion of J. Clark Maxwell concerning the physiology of color but the problem is as yet unsolved.

**COLOR PRINTING**, the art of producing pictures, designs, cards, etc., in various colors by means of lithography, printing from metal blocks, etc. The ordinary methods are: (1) the chromolithographic, in which a tracing of the original picture, or the like, is first made, and a copy transferred to as many stones as there are colors in the original, every color requiring a fresh stone. The drawing on each stone is made to fit in, or register, with the preceding one, and as the paper passes through the machine an additional color is added each time, and thus the picture is built up color upon color (each being allowed to dry before the next is put on) until it is completed. Some chromos or oleographs may have as many as 25 or 30 printings or colors. (2) Block or surface color printing is specially adapted for book illustrations or similar work where nicety of detail or rapidity of production is required. As in chromo-lithography various printings are necessary; but these, while producing similar effects, are reduced in number by a method of printing several tints of the same color at one operation. Each block, which is usually of zinc and prepared in the usual way, is capable of producing three or more gradations of the same color; the darkest shade from the normal surface, lighter shades being got from parts which have been bitten or corroded in an almost imperceptible degree—the deeper corrosions giving, of course, the lightest shade. When all the tints of one color are thus printed from one block and at one operation, a second block with gradations, in the same way, is used, registering as in chromo-lithography, and so on until the picture is finished.

**COLORS**, a term used to indicate the flag or standard, of a people or a party;

hence, in popular speech, anything which shows the true state of affairs.

The colors carried in the United States Army by the various regiments and battalions are two in number, the national flag (see Flag) and the regimental color, both of which are of prescribed size and form for the various arms of the service. The battalions of engineers carry the national flag, with the title of the battalion embroidered in silver on the center stripe; and the battalion color, of scarlet silk having in the center a castle, with the number of the battalion placed above the castle, and the words "U. S. Engineers" below. The artillery corps have similar colors, on which the corps device of two crossed cannons are emblazoned. Infantry regiments have the same national color as artillery and engineers; the regimental color being of blue silk, the coat of arms of the United States embroidered in silk on the center, beneath the eagle, a red scroll with number and name of regiment embroidered in white; cavalry standards in size are somewhat smaller than those carried by the infantry and consist of a national flag made of silk. The regimental standard is of yellow silk, with the coat of arms of the United States embroidered in silk on the center, beneath the eagle a red scroll, with number and name of regiment embroidered in yellow, fringe yellow.

**COLOSSEUM**, a name given to the Flavian Amphitheatre in Rome, a large edifice for gladiatorial combats, fights of wild beasts, and similar sports. It was begun by Vespasian, and finished by Titus 80 A.D. The outline of the Colosseum is elliptic, the exterior length of the building being 620 and its breadth 513 feet; it is pierced with eighty openings or vomitoria in the ground story, over which are superimposed three other stories, the whole rising perpendicularly to the height of 160 feet. Although two-thirds of the original building have disappeared it is still a wonderful structure.

**COLOS'SIANS**, Epistle to the. was written to the Colossians by the Apostle Paul either from Rome or Cæsarea, at the same time that he wrote the Epistles to the Ephesians and to Philemon. The epistle contains a summary of Christian doctrine, especially dwelling on the divine power and majesty of Christ, and a series of practical exhortations to specific duties of Christian morality.

**COLOS'SUS**, in sculpture, a statue of enormous magnitude. The Asiatics, the Egyptians, and in particular the Greeks, have excelled in these works. Among the colossi of Greece the most celebrated was the Colossus of Rhodes, a brass statue of Apollo 70 cubits high, esteemed one of the wonders of the world, erected at the port of Rhodes by Chares, 290 or 288 B.C. It was thrown down by an earthquake about 224 B.C. There is no authority for the popularly-received statement that it bestrode the harbor mouth, and that the Rhodian vessels could pass under its legs; and Bartholdi's statue of Liberty presented to the U. States by the French nation, and which measures 104 feet, or to the extremity of the torch in the hand of the figure 138 feet. It is erected at New York harbor on a pedestal 114 feet, is

constructed for a lighthouse with one of the most powerful fixed lights in the world, and stands 317 feet above mean tide.

**COLQUITT**, Alfred Holt, an American senator, governor, and soldier, born in Georgia in 1824, died in 1894. He served in the Mexican war, was a member of congress from 1853-5, and rose to the rank of major-general in the Confederate army. He was governor of Georgia from 1876 to 1882 and from that year to his death United States Senator from Georgia.

**COLT**, Samuel, an American inventor, born in 1814, died in 1862. Colt invented the revolver and his name is a synonym for the weapon. He got the idea while working in his father's factory at Hartford, Conn., and made frequent improvements on his original patent. He laid the first submarine cable in New York harbor and was the first to construct a rational protective armor for water cables of any kind.

**COLTON**, Walter, an American pioneer and author, born in Vermont in 1797, died in 1851. He was early a teacher and having gone to California in the early forties he founded The Californian, the first newspaper published in the state. His newspaper was the first to announce the discovery of gold on the Pacific coast.

**COLT'S REVOLVER**. See Revolver.

**COLUM'BIA**, the capital of South Carolina, situated on an elevated plain on the left bank of the Congaree. It is regularly laid out, and contains some fine public buildings, including the state-house. Among the educational institutions are the South Carolina University, founded in 1804, and a Presbyterian theological college. Pop. 25,100.

**COLUMBIA**, a city in Pennsylvania, on the Susquehanna, a great mart for lumber. Pop. 14,116.

**COLUMBIA**, British. See British Columbia.

**COLUMBIA**, District of, a small tract of country in the U. States, on the Potomac, about 120 miles from its mouth, surrounded on three sides by Maryland, forming a neutral district for the seat of the national government. It has an area of 64 sq. miles; was formed into a territory in 1871; and contains the city of Washington, which has been the national capital since 1800 (and now includes also Georgetown). The affairs of the district and of Washington are administered by three commissioners directly under Congress. Pop. 298,718.

**COLUMBIA RIVER**, or **OREGON**, a river in N. America, flowing into the Pacific Ocean, and rising at the base of the Rocky Mountains in British Columbia. It has a very winding course partly in British Columbia but mainly in the U. States, where it receives two large tributaries, Clark's River and Snake River. Latterly it turns abruptly to the west and forms the boundary between Washington Territory and Oregon. It drains an area of 298,000 sq. miles, and has a length of about 1400 miles.

**COLUMBIA UNIVERSITY**, a large institution in New York City, founded



in 1746. It has an endowment of \$20,000,000, an income of nearly \$1,000,000, a library of 315,000 volumes, and a total attendance of 3632 students. The university is made up of an undergraduate department and graduate schools of science, medicine and law, while its affiliations with various theological schools in New York enable it to offer education in theology also. For many years it has been slowly adding institution after institution to its body until now it is virtually equipped as a complete university. It confers all degrees, including engineering (mechanical and mining) and recently it absorbed Barnard College and Teachers' College, thus providing pedagogy to its curricula. It is governed by a board of 24 trustees.

**COLUMBIAN UNIVERSITY**, an institution at Washington, D. C., founded in 1821 by members of the Baptist church. It offers courses in the arts and sciences, in medicine, law, dentistry, theology, and in electrical, mining, and mechanical engineering. The university has an endowment of \$1,000,000, a library of 20,000 volumes, and a registration of 1420 students.

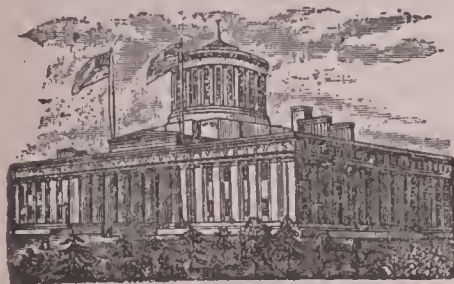
**COL'UMBINE**, the popular name of plants with five colored sepals and five spurred petals. The common columbine is a favorite flower, and owes its name to the fancied resemblance of the petals to the form of pigeons.

**COL'UMBINE**, in the older pantomimes, a female mask with whom Harlequin was in love; their marriage formed the dénouement. In modern pantomime the chief female dancer in the harlequinade.

**COLUM'BIUM**. See Niobium.

**COLUMBUS**, a town in Georgia, on the Chattahoochee River, well built, with cotton and other manufactures. Pop. 20,000.

**COLUMBUS**, Ohio, the capital of the state, in Franklin county, on the east bank of the Scioto. It contains some notable public buildings. The capitol is second in size only to that of Wash-

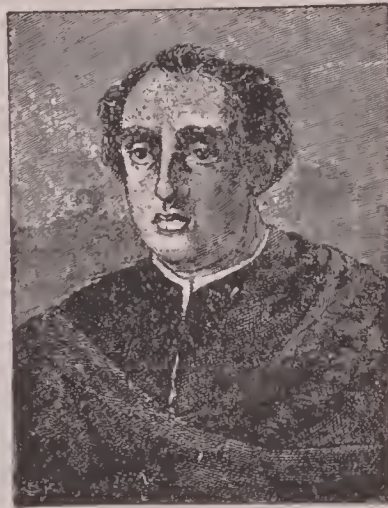


State capitol, Columbus, O.

ington, and is built of gray limestone in the simple Doric style. Other buildings are the deaf and dumb institution, institution for the blind, lunatic asylum, penitentiary, R. Catholic cathedral, etc. Educational institutions include the state university, Columbus medical college, Starling medical college, etc. There is a very extensive trade, and the manufactures are important and varied. Pop. 179,370.

**COLUMBUS**, Christopher, was born in Genoese territory in 1435 or 1436, died at Valladolid, Spain, 1506. His

father, Domenico Colombo, a poor woolcomber, gave him a careful education. He appears to have gone to sea at an early age and to have navigated all parts of the Mediterranean and some of the coasts beyond the Straits of Gibraltar. In 1470 we find him at Lisbon, where he married the daughter of Bartolommeo de Palestrello, a distinguished navigator. He had gradually come to the conclusion that there were unknown



Columbus.

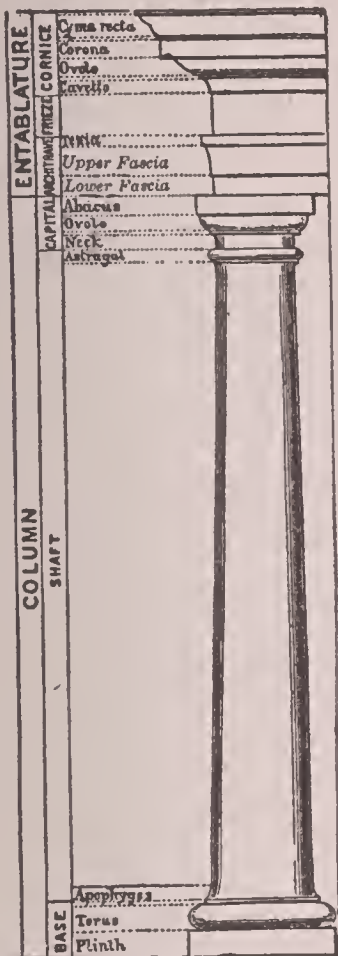
lands belonging to Eastern Asia separated from Europe by the Atlantic: while the Portuguese were seeking to reach India by a southeast course round Africa he was convinced that there must be a shorter way by the west. He applied in vain to Genoa for assistance, and equally fruitless were his endeavors to interest John II. of Portugal in the enterprise. He then determined to apply to the Spanish court; and after many disappointments he induced Ferdinand and Isabella to equip and man three vessels for a voyage of discovery. It was early in the morning of Friday, on the 3d of August, 1492, that Columbus set sail from the port of Palos, and after sailing for two months the expedition narrowly escaped failure. The variation of the needle so alarmed the crews that they were on the point of breaking out into open mutiny, and he was obliged to promise that he would turn back if three more days brought no discovery. On the third day (12th Oct. 1492) the island of Guanahani or San Salvador was sighted, which Columbus believed to belong to Eastern Asia and to be connected with India—a belief which he carried with him to his grave. Hence the mistaken name of Indians applied to the natives of America, and that of West Indies applied to the group of islands. Columbus, planted the royal standard, and in the name of his sovereigns took possession of the country, which, in memory of his reservation he called San Salvador. He then sailed in search of other lands, and discovered Cuba, St. Domingo, and some other of the West India Islands. Being so far successful, he built a fort at Hispaniola, Hayti, left some of his men there, and set out on his return to Europe, where he was received with

almost royal honors. In 1493 he set out on his second great voyage from Cadiz, with three large ships of heavy burden and fourteen caravels, carrying 1500 men. He discovered the island of Dominica, and afterwards Mariegalante, Guadeloupe, and Porto Rico, and at length arrived at Hispaniola. Finding the colony destroyed, he built a fortified town, which he called, in honor of the queen, Isabella. He then left the island in order to make new discoveries, visited Jamaica, and returning after a voyage of five months, worn down with fatigue, found to his great joy that his brother Bartolommeo had arrived at Isabella with provisions and other supplies for the colony. In May, 1498, he sailed with six vessels on his third voyage. Three of his vessels he sent direct to Hispaniola; with the three others he took a more southerly direction, and having discovered Trinidad and the continent of America, returned to Hispaniola. His colony had now been removed from Isabella, according to his orders, to the other side of the island, and a new fortress erected called St. Domingo. Columbus found the colony in a state of confusion, but soon restored tranquility. His enemies, in the meantime, endeavored to convince his sovereigns that his plan was to make himself independent, and Columbus was not only displaced, but Francisco de Bobadilla, a new governor who had come from Spain, even sent him to that country in chains. On his arrival (in 1500) orders were sent directing him to be set at liberty and inviting him to court, but for this injurious treatment he never got redress, though great promises were made. After some time he was able to set out on his fourth and last voyage (1502) in four slender vessels supplied by the court. In this expedition he was accompanied by his brother Bartolommeo and his son Hernando. He encountered every imaginable disaster from storms and shipwreck, and returned to Spain, sick and exhausted, in 1504. The death of the queen soon followed, and he urged in vain on Ferdinand the fulfilment of his promises; but after two years of illness, humiliations, and despondency, Columbus died at Valladolid. His remains were transported, according to his will, to St. Domingo, but on the cession of Hispaniola to France they were removed to Havana in Cuba in 1796. In 1899 they were carried back to Spain.

**COL'UMN**, in architecture, a round pillar, a cylindrical solid body set upright and primarily intended to support some superincumbent weight. A column has as its most essential portion a long solid body, called a shaft, set vertically on a stylobate, or on a congeries of moldings which forms its base, the shaft being surmounted by a more or less bulky mass which forms its capital. In classical architecture columns have commonly to support an entablature consisting of three divisions, the architrave, frieze, and cornice, adorned with moldings, etc. The accompanying cut will illustrate these and other terms. Columns are distinguished by the names of the styles of architecture to which they belong; thus there are



Hindu, Egyptian, Grecian, Roman, and Gothic columns. In classic architecture they are further distinguished by the name of the order to which they belong, as Doric, Ionic, Corinthian, Composite or Tuscan columns. They may also be characterized by some peculiarity of position, of construction, of form, or of



Column (Tuscan order), illustrating the terms applied to the several parts.

ornament, as attached, twisted, cabled, etc., columns. Columns are chiefly used in the construction or adornment of buildings. They have also been used, however, singly for various purposes, especially for monuments. See Corinthian, Doric, Ionic, Gothic, etc.

**COLUMN**, in military tactics, a formation of troops drawn up in deep files, showing a small front; as distinguished from line, which is extended in front and thin in depth. They are said to be close or open according to the intervals between the battalions, regiments, etc., of which they are composed. Sometimes the name column is given to a small army, especially when actively engaged.

**COMA**, in medicine, a state of complete insensibility, resulting from various diseases, as apoplexy; from narcotics, as opium; from accident or injury to the brain; or from excessive cold.

**COMANCHES** (kō-man'chez), an American Indian tribe formerly roaming through Texas and part of Mexico. They were excellent horsemen, and extremely warlike, but their numbers are now insignificant. Some of them have been collected on a reservation in the western part of the Indian Territory.

**COMB**, an instrument with teeth, made of tortoise-shell, ivory, horn, wood, bone, metal, or other material, used for dressing the hair, and by women for keeping the hair in its place when dressed. Combs have been used from the earliest times by rude as well as by civilized races.

**COMBINATION**, in the United States, a union of persons for the furtherance of their business interests. Combination is lawful when it is not in restraint of trade, nor made with a view of violently or fraudulently interfering with others in the pursuit of their occupation. When so, it is called conspiracy and is punishable under conspiracy acts.

**COMBUSTION**, the operation of fire on inflammable substances; or the union of an inflammable substance with oxygen or some other supporter of combustion, attended with heat and in most instances with light. In consequence of the combination of the carbon in fuel with the oxygen of the air being the universal method of getting heat and light, and as when the action takes place the fuel is said to burn or undergo combustion, the latter term has been extended to those cases in which other bodies than carbon—for example, phosphorus, sulphur, metals, etc.—burn in the air or in other substances than air—for example, chlorine. Though the action between the gas and the more solid material, as coal, wood, charcoal, of whose combination combustion is the result, is mutual, the one having as much to do with the process as the other, yet the former, as oxygen, chlorine, iodine, and the compounds which they form with each other and with nitrogen, have received the name of supporters of combustion, while to the latter the term combustibles has been assigned.

Spontaneous Combustion is the ignition of a body by the internal development of heat without the application of fire. It not unfrequently takes place among heaps of rags, wool, and cotton when lubricated with oil; hay and straw when damp or moistened with water; and coal in the bunkers of vessels. In the first case the oil rapidly combines with the oxygen of the air, this being accompanied with great heat; in the second case the heat is produced by a kind of fermentation; in the third by the pyrites of the coal rapidly absorbing and combining with the oxygen of the air. The term is also applied to the extraordinary alleged phenomenon of the human body being reduced to ashes without the direct application of fire. It is said to have occurred in the aged and persons that were fat and hard drinkers; but most chemists reject the theory altogether, maintaining that none of the instances adduced are well authenticated.

**COMEDIE FRANCAISE**, the national subsidized theater of France, formed in 1680 by the fusion of the two bodies into which Molière's company of actors had split. It is at present managed by regulations, made in 1812, modified by subsequent resolutions.

**COMEDIETTA**, a dramatic composition of the comedy class, but not so much elaborated as a regular comedy,

and generally consisting of one or at most two acts.

**COMETS**, certain celestial bodies which appear at irregular intervals, moving through the heavens in paths which seem to correspond with parabolic curves, or in a few instances in elliptical orbits of great eccentricity. The former, after being visible from the earth for a shorter or longer time, disappear into space apparently never to return; the latter return to us periodically. Some comets are only visible by the aid of the telescope, while others can be seen by the naked eye. In the latter case they usually appear like stars accompanied with a train of light, sometimes short and sometimes extending over half the sky, mostly single and more or less curved but sometimes forked. In a comet which appeared in 1744 the train was divided into several branches, spreading out from the head like a fan. The train is not stationary relatively to the head, but is subject to remarkable movements. The direction in which it points is always opposite to the sun, and as the comet passes its perihelion the train changes its apparent position with extraordinary velocity. The head of the comet is itself of different degrees of luminosity, there being usually a central core, called the nucleus, of greater brilliancy than the surrounding envelope, called the coma.

Comets were long regarded as supernatural objects, and usually as portents of impending calamity. Tycho Brahe was the first who expressed a rational opinion on the subject, coming to the conclusion that the comet of 1577 was a heavenly body at a greater distance from the earth than that of the moon. The general law of the motion of bodies, as well as his own observations on the comet of 1680, led Newton to conclude that the orbits of the comets must, like those of the planets, be ellipses, having



Comet of 1811.

the sun in one focus, but far more eccentric; and having their aphelions, or greater distances from the sun, far remote in the regions of space. This idea was taken up by Halley, who collated the observations which had been made of all the twenty-four comets of which notice had been taken previous to 1680. The results were very interesting. With but few exceptions the comets had passed within less than the earth's shortest distance from the sun, some of them within less than one-third of it, and the average about one-half. Out of the number, too, nearly two-thirds



had had their motions retrograde, or moved in the opposite direction to the planets. While Halley was engaged on these comparisons and deductions the comet of 1682 made its appearance, and he found that there was a wonderful resemblance between it and three other comets that he found recorded—the comets of 1456, of 1531, and of 1607. The times of the appearance of these comets had been at very nearly regular intervals, the average period being between seventy-five and seventy-six years. Their distances from the sun, when in perihelion, or when nearest to that luminary, had been nearly the same, being nearly six-tenths of that of the earth, and not varying more than one-sixtieth from each other. The inclination of their orbits to that of the earth had also been nearly the same, between  $17^{\circ}$  and  $18^{\circ}$ ; and their motions had all been retrograde. Putting these facts together, Halley concluded that the comets of 1456, 1531, 1607, and 1682 were reappearances of one and the same comet, which revolved in an elliptic orbit round the sun, performing its circuit in a period varying from a little more than seventy-six years to a little less than seventy-five; or having, as far as the observations had been carried, a variation of about fifteen months in the absolute duration of its year, measured according to that of the earth.

It now became possible to predict the reappearance of comets with certainty. Sometimes a comet may split up into thousands of small pieces and reappear as "shooting stars." Among the famous comets are those of Encke (1786 and



Donati's comet, 1858.

1818), Biela's comet (1826, 1839, 1845), which in 1846 split in two and has since been entirely dissipated; and Donati's comet (1858). The tails of comets are sometimes many millions of miles in length.

That the comets are formed of matter of some sort or other we know from the dense and opaque appearance of their nucleus, as well as from the action of the planets upon them; but as their action upon the planets has not been great, or even perceptible, we are led to the conclusion that they are not bodies of the same density or magnitude as even the smallest and rarest of the planets. One modern theory of the nature of comets is that these bodies were ejected millions of years ago from the interior of suns, or planets in a sun-like state. When a comet is viewed through a telescope of considerable power there appears a dense nucleus in the center of the luminous and apparently vaporous matter of which the external parts are composed; and the opacity of this nucleus varies in different

comets. On its first appearance, and again when it recedes, the luminous part of the comet is faint and does not extend far from the nucleus; but as it moves on toward the perihelion the brightness increases, and the luminous matter lengthens into a train, which, in some cases, has extended across a fourth of the entire circumference of the heavens. The most remarkable discovery of recent times regarding comets is the identity of the course of some of them with the orbit of certain showers of shooting-stars. This was first demonstrated by the Italian astronomer Schiaparelli, who proved the agreement between the orbit of the great comet of 1862 and that of the star-shower seen annually about August 9, 10. It has since been demonstrated that every meteoric stream follows in the train of some comet large or small, which either exists now or has been dissipated, as Biela's comet was, leaving only its meteoric trail to show where it once traveled; and that every comet is followed or preceded by a train of meteors, extending over a greater or less portion of the comet's orbit according to the length of time during which the comet has existed.

**COMITY OF NATIONS**, a phrase adopted in international law to denote that kind of courtesy by which the laws and institutions of one state or country are recognized and given effect to by the government of another.

**COMMA**, in punctuation, the point [,] denoting the shortest pause in reading, and separating a sentence into divisions or members according to the construction.—In music, a comma is the smallest enharmonic interval, being the difference between a major and a minor tone, and expressed by the ratio 80:81.

**COMMANDER**, a chief; the chief officer of an army or any division of it. The office of commander-in-chief is the highest staff appointment in the army. The title is sometimes not commander-in-chief, but field-marshal commanding-in-chief, the difference being that the former is appointed by patent for life, while the latter is appointed by a letter of service, and holds office only during the pleasure of the sovereign. In the navy, a commander holds a definite rank above lieutenant and under captain. In matters of etiquette he ranks with a lieutenant-colonel in the army. In large vessels there is a commander as well as a captain, but in sloops and vessels of that class the commander is the highest officer.

**COMMANDERY**, a term used in several senses in connection with some of the military and religious orders. Among several orders of knights as the Templars, Hospitalers, etc., it was a district under the control of a member of the order (called a commander or preceptor), who received the income of the estates belonging to the knights within that district, and expended part for his own use and accounted for the rest; in England, more especially applied to a manor belonging to the priory of the Knights Hospitalers or Knights of St. John of Jerusalem. In certain religious orders, as those of St. Bernard and St. Anthony, it was the

district under the authority of a dignitary called a commander.

**COMMENCEMENT**, in the universities of the United States, the day when masters of arts and doctors receive their degrees.

**COMMENSURABLE**, an appellation given to such quantities or magnitudes as can be measured by one and the same common measure. Commensurable numbers are such as can be measured or divided by some other number without any remainder; such are 12 and 18, as being measured by 6 or 3.

**COMMENTARY**, a term used (1) in the same sense as memoirs, for a narrative of particular transactions or events as the Commentaries of Cæsar. (2) A series or collection of comments or annotations. These may either be in the form of detached notes, or may be embodied in a series of remarks written and printed in a connected form.

**COMMERCE**, the interchange of goods, merchandise, or property of any kind between countries or communities; trade; traffic.

**COMMERCIAL LAW**, the law which regulates commercial affairs among the merchants of different countries, or among merchants generally. It is derived from the different maritime codes of mediæval Europe, the imperial code of Rome, international law, and the custom of merchants.

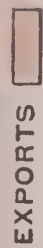
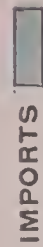
**COMMERCIAL TREATIES**, treaties entered into between two countries for the purpose of improving and extending their commercial relations; each country engaging to abolish or to reduce to an agreed rate or otherwise modify the duties on articles of production and manufacture imported from the one country into the other. They are usually for a limited period, but may be renewed and modified according to altering conditions. In these treaties the phrase, "most favored nations," implies concessions equal to the most favorable granted under any similar treaty. The first treaty of commerce made by England with any foreign nation was entered into with the Flemings in 1272; the second was with Portugal and Spain, 1308. Among modern treaties the most famous is that negotiated between Richard Cobden, the English free-trader, and the ministers of Napoleon III. in 1860, and which resulted in great benefit to both nations. A second one was signed in 1873, but negotiations for a third in 1882 fell through chiefly owing to French protectionist prejudices. Several treaties of reciprocity have been made between the United States and other countries, notably France and Canada.

**COMMISSA'RIAT**, the department of an army whose duties consist in supplying transport, provisions, forage, camp equipage, etc., to the troops, but not arms, ammunition, etc.; also the body of officers in that department.

**COMMISSION, MILITARY**, the authorization of rank or right to command in the army, generally in the form of a certificate. A commission is issued only by the President of the United States. In Britain military commissions were formerly purchasable but this custom was abolished in 1871.



# AMERICAN IMPULS AND EXPOSURES; THEIR KATU AND DESTINATION



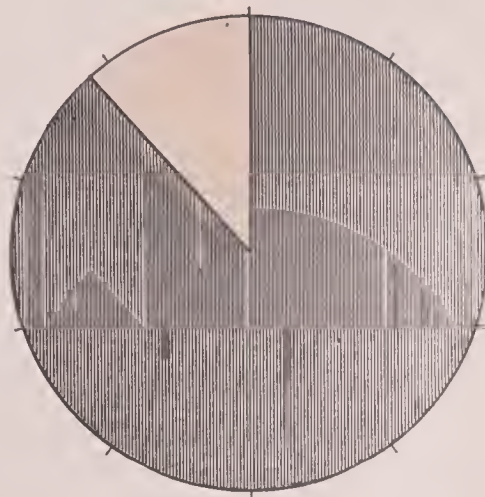
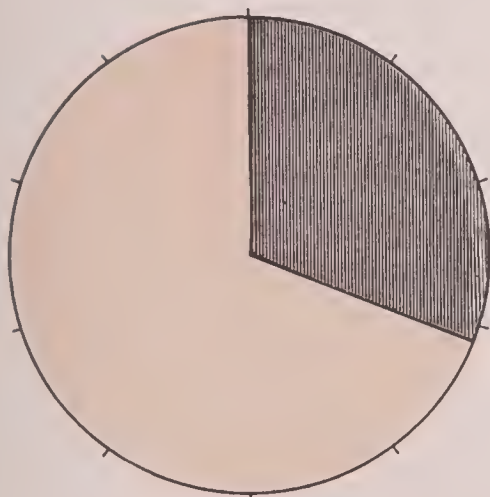




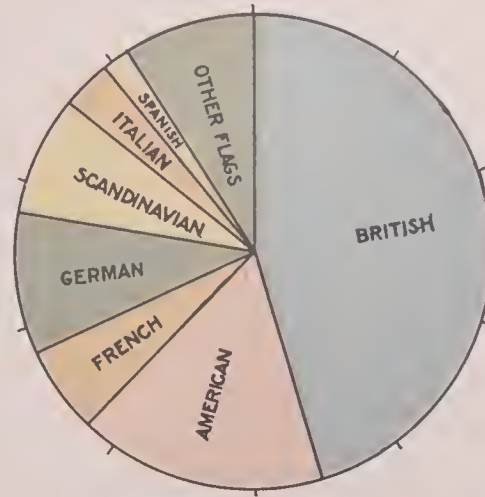
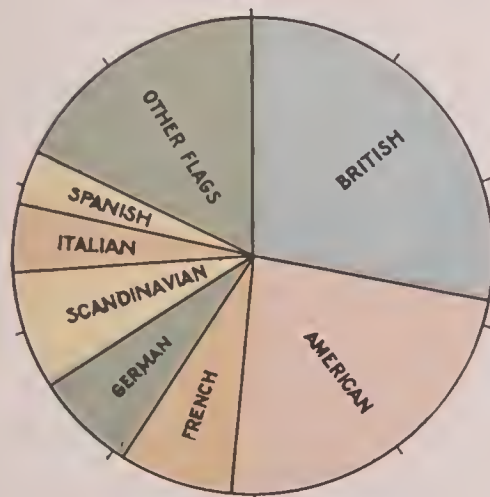


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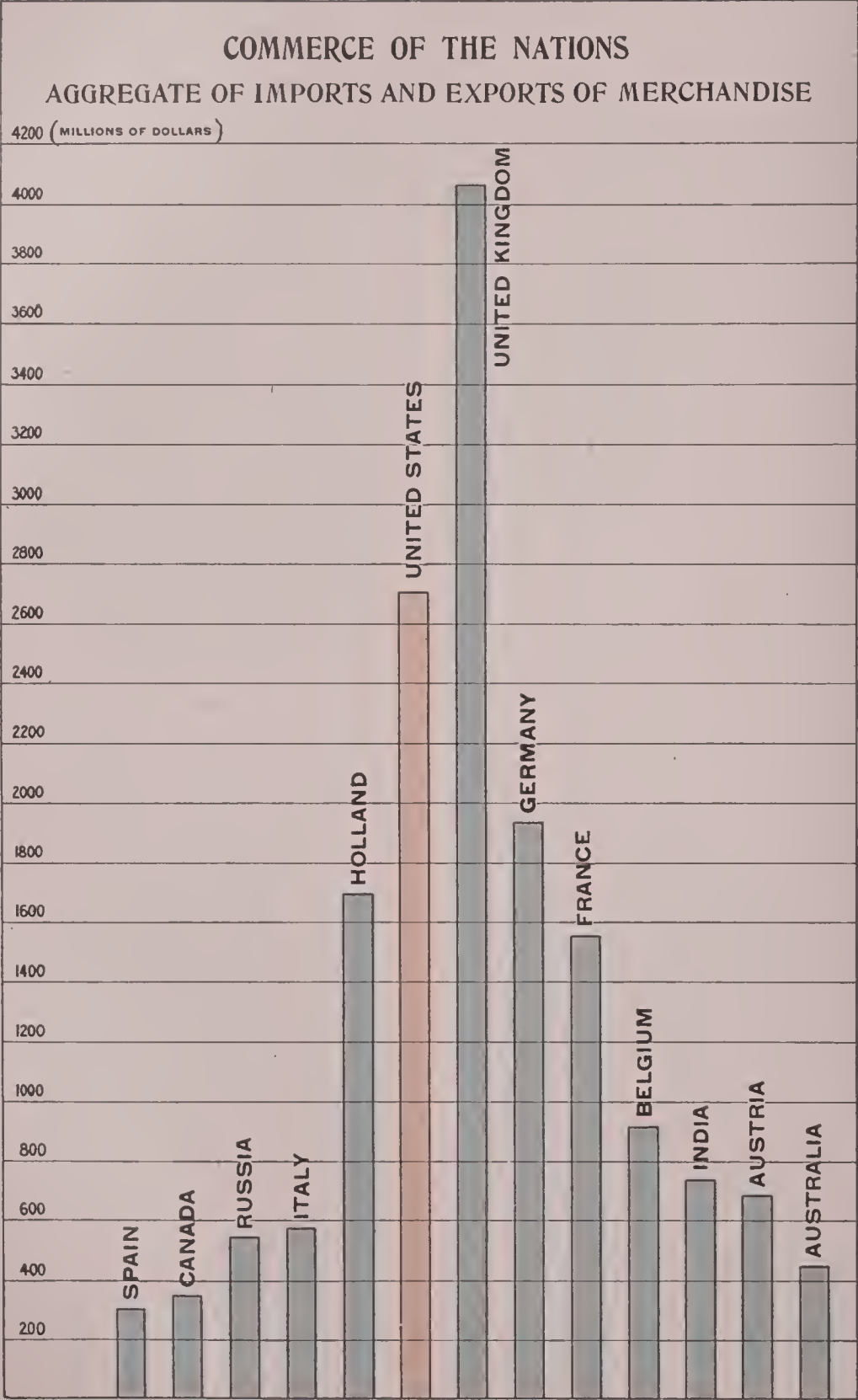
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**COMMISSIONAIRE**, on the continent of Europe hotel runners and general servants of hotels who look after the luggage of guests whom they meet at the railway stations or docks. In Germany commissioners are analogous to messenger boys in the United States.

**COMMITMENT**, a warrant of a magistrate holding an accused person to trial. The word is also used to designate an order sending a person to jail for contempt of court, or other offense.

**COMMITTEE**, one or more persons elected or appointed to attend to any matter or business referred to them either by a legislative body, or by a court, or by any corporation, or by any society or collective body of men acting together. In legislative bodies, when a committee consists of the whole members of the body acting in a different capacity from that which usually belongs to them it is called a committee of the whole house, the business of which is conducted under somewhat different regulations from those under which the business of the house when not in committee is carried on.—Standing committees are such as continue during the existence of legislature, and to these are committed all matters that fall within the purposes of their appointment, as the committee of elections or of privileges, etc.—Select committees are appointed to consider and report on particular subjects.

**COMMITTEE OF PUBLIC SAFETY**, a body elected by the French Convention (6th April, 1793) from among its own members, at first having very limited powers conferred upon it—that of supervising the executive and of accelerating its actions. Subsequently, however, its powers became extended; all the executive authority passed into its hands, and the ministers became merely its scribes. It was at first composed of nine, but was increased to twelve members viz.: Robespierre, Danton, Couthon, St. Just, Prieur, Robert-Lindet, Héroult de Séchelles, Jean-Bon St. André, Barrère, Carnot, Collot d'Herbois, and Billaud Varennes. The severe government of this body is known as the Reign of Terror, which ended with the execution of Robespierre and his associates in July, 1794. During the commune (March to May, 1871) a similar committee was established in Paris.

**COMMODORE**, in the navy, an officer, generally a captain, holding a temporary commission with a rank between that of captain and admiral, who commands a ship or detachment of ships in the absence of an admiral. They are of two kinds—one having a captain under him in the same ship, and the other without a captain. They both carry distinguishing pennants. The title is also given to the senior captain of a line of merchant vessels, and also to the president of a yachting club.

**COMMON CARRIERS**. See Carriers.

**COMMON COUNCIL**, the council of a city or corporate town, empowered to make by-laws for the government of the citizens. The common councils sometimes consist of two houses, chambers, or courts, and sometimes form only one.

Thus the common council of London consists of two houses, the upper house, composed of the lord-mayor and aldermen, and the lower house of the common council men, who are elected annually. In the United States several cities have two houses of municipal legislature, notably St. Louis. The term common council is not used so familiarly in this country as in England, the term city council being preferred.

**COMMONER, IN BRITAIN**, a term applied to all citizens except the hereditary nobility.

**COMMON LAW**, the unwritten law, the law that receives its binding force from immemorial usage and universal reception, in distinction from the written or statute law; sometimes from the civil or canon law; and occasionally from the *lex mercatoria*, or commercial and maritime jurisprudence. It consists of that body of rules, principles, and customs which have been received from former times, and by which courts have been guided in their judicial decisions. The evidence of this law is to be found in the reports of those decisions and the records of the courts. Some of these rules may have originated in edicts or statutes which are now lost, or in the terms and conditions of particular grants or charters; but it is quite certain that many of them originated in judicial decisions founded on natural justice and equity, or on local customs. It is contrasted with (1) the statute law contained in acts of parliament; (2) equity, which is also an accretion of judicial decisions, but formed by a new tribunal, which first appeared when the common law had reached its full growth; and (3) the civil law inherited by modern Europe from the Roman Empire. Wherever statute law, however, runs counter to common law, the latter is entirely overruled; but common law, on the other hand, asserts its pre-eminence where equity is opposed to it.

**COMMON PLEAS**, Court of, formerly one of three superior courts of common law in England, presided over by a lord chief-justice and five (at an earlier period four) puisné judges, and having cognizance of all civil causes, real, personal, or mixed, as well by original writ as by removal from the inferior courts; now merged in the High Court of Justice.

**COMMON PRAYER**, Book of, the liturgy or public form of prayer prescribed by the Church of England to be used in all churches and chapels, and which the clergy are to use under a certain penalty. The Book of Common Prayer is used also by the English-speaking Episcopal churches in Scotland, Ireland, America, and the colonies, as well as by some non-episcopal bodies, with or without certain alterations. It dates from the reign of Edward VI.; was published in 1549, and again with some changes in 1552. Some slight alterations were made upon it when it was adopted in the reign of Elizabeth. In the reign of James I., and finally soon after the Restoration, it underwent new revisions.

**COMMONS**, House of. See Britain and Parliament.

**COMMON SCHOOLS**, in the United States, the public schools, including the primary and high schools, and the normal schools. The present system of graded schools is a vast enlargement and improvement of the elementary schools of colonial times. To assist in the support of the public schools the government, and sometimes the several states, particularly in the west, have given grants of land the sale of which has helped to defray the expenses of public education. About 16,000,000 children are enrolled in the common schools of the United States. In the instruction of these nearly 500,000 teachers are engaged, and the total expenditures for the support of these schools aggregate nearly \$220,000,000 annually.

**COMMON TIME**, in music, is that in which every bar contains an even number of subdivisions, such as two minims, four quavers, or their equivalents. It is of two kinds, simple and compound. Simple common time is that which includes four beats in a bar, or any division of that number, or square of the number or its divisions. Compound common time includes two or four beats of three crochets or quavers to each beat.

**COMMONWEALTH**, the whole body of people in a state; the body politic. In Eng. hist. the name given to the form of government established after the death of Charles I., and which lasted until the restoration of Charles II. (1649–59).

**COMMUNALISM**, the theory of government by communes or corporations of towns and districts, adopted by the advanced republicans of France and elsewhere. The doctrine is that every commune, or at least every important city commune, as Paris, Marseilles, Lyons, etc., should be a kind of independent state in itself, and France merely a federation of such states. This system must not be confounded with communism, with which, however, it is naturally and historically allied, though the two are perfectly distinct in principle.

**COMMUNE**, a small territorial district in France, being one of the subordinate divisions into which that country is parcelled out; the name is also given to similar divisions in some other countries, as Belgium. In the country a commune sometimes embraces a number of villages, while some large cities are divided into a number of communes. In either case each commune is governed by an officer called a mayor.

**COMMUNE OF PARIS**.—1. A revolutionary committee which took the place of the municipality of Paris in the French revolution of 1789, and soon usurped the supreme authority in the state. Among its chiefs were some of the most violent of the demagogues, such as Hébert, Danton, and Robespierre. 2. The name adopted by the ultra-radical party in Paris brought once more into prominence by the events of the Franco-German war, more immediately by the siege of Paris (Oct. 1870 to Jan. 1871). They ruled over Paris for a brief period after the evacuation of the German troops, and had to be suppressed by



troops collected by the National Assembly of France. The rising was entirely political and confined to Paris; it was based on no well defined dogmas, only a fractional part of the communal government being communists in the economic sense, and these were soon thrust aside by their more violent and unscrupulous comrades. Much bloodshed and wanton destruction of property took place before the rising was put down by M. Thiers' government.

**COMMUNION**, the act of partaking with others of the sacramental symbols in the Lord's Supper. See Lord's Supper.

**COMMUNISM**, the economic system or theory which upholds the absorption of all proprietary rights in a common interest, an equitable division of labor, and the formation of a common fund for the supply of all the wants of the community; the doctrine of a community of property, or the negation of individual rights in property. No communistic society has as yet been successful. Robert Owen made several experiments in modified communism, but they failed. St. Simon, Fourier, and Proudhon have been the chief exponents of the system in France; and under the names of socialism, nihilism, etc., it seems to be working as a great unseen force in several countries.

**COMO**, capital of the province of Como, in the north of Italy (Lombardy), 24 miles n.n.w. of Milan. Pop. 25,560.—The province of Como has an area of 1049 sq. miles, and a pop. of 515,134.

**COMPANION**, a raised hatch or cover to the cabin stair of a merchant vessel.—Companion Ladder, the steps or ladder by which persons ascend to and descend from the quarter-deck.

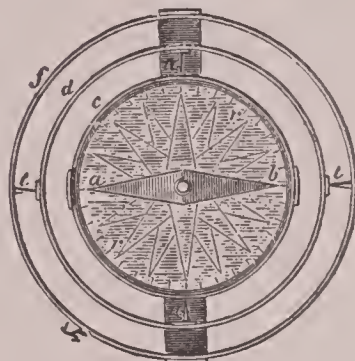
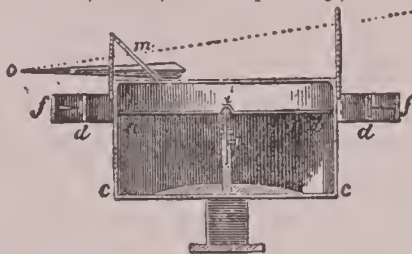
**COMPANY**, in military language, a subdivision of an infantry regiment or battalion, corresponding to a troop of cavalry or a battery of artillery, consisting of from 60 to 100 men and commanded by a captain.

**COMPARATIVE ANATOMY**. See Anatomy.

**COMPARISON**, Degrees of, in grammar, inflections of adjectives or adverbs to express degrees of the original quality, usually divided into positive, comparative, and superlative; as strong, stronger, strongest, glorious, more glorious, most glorious.

**COMPASS**, an instrument used to indicate the magnetic meridian or the position of objects with respect to that meridian, and employed especially on ships, and by surveyors and travelers. Its origin is unknown, but it is supposed to have been brought from China to Europe about the middle of the 13th century. As now generally used it consists of three parts: namely, the box, the card or fly, and the needle—the latter being the really essential part, and consisting of a small magnet so suspended that it may be able to move freely in a horizontal direction. The box, which contains the card and needle, is, in the case of the common mariner's compass, a circular brass receptacle hung within a wooden one by two concentric rings called gimbals, so fixed by the cross centers to the box that the inner one, or compass-box, shall retain

a horizontal position in all motions of the ship. The circular card is divided into thirty-two equal parts by lines drawn from the center to the circumference, called points or rhumbs; the intervals between the points are also divided into halves and quarters, and the whole circumference into equal parts or degrees, 360 of which complete the circle; and, consequently, the dis-



Ship's compass.

*ab*, Needle. *cc*, Box. *dd*, Inner gimbal. *ff*, Outer gimbal. *i*, Pivot upon which the card is placed. *m*, Reflector. *rr*, Card. *tt*, *uu*, Supporting pivots.

tance or angle comprehended between any two rhumbs is equal to  $11\frac{1}{4}^{\circ}$ . The four principal are called cardinal points: viz., North, South, East, and West. The names of the rest are compounded of these. The needle is a small bar of magnetized steel. It is fixed on the under side of the card, and in the center is placed a conical socket, which is poised on an upright pointed pin fixed in the bottom of the box; so that the card, hanging on the pin, turns freely round its center, and one of the points, by the property of the needle, will al-



Compass card.

ways be directed toward the north pole. The needle, however, is liable to a certain deviation owing to the magnetism of the ship itself, and this is especially strong in iron ships. (See Deviation.) To obviate this Sir W. Thomson (Lord Kelvin) invented a compass, having a number of needles arranged in a particular manner instead of one. In this compass quadrantal errors are corrected

by means of two iron globes fixed on opposite sides of the binnacle; while the various components of the ship's magnetic force are neutralized by a series of bar-magnets so arranged as to act as correctors. In the compass used by land-surveyors and others the needle is not fixed to the card, but plays alone, the card being drawn on the bottom of the box.

**COMPASSES**, or **PAIR OF COMPASSES**, a mathematical instrument used for the describing of circles, measuring lines, etc. They consist simply of two pointed legs, movable on a joint or pivot, and are used for measuring and transferring distances. For describing circles the lower end of one of the legs is removed and its place supplied by a holder for a pencil or pen.—Hair Compasses are compasses having a spring tending to keep the legs apart, and a finely-threaded screw by which the spring can be compressed or relaxed with the utmost nicety, and the distance of the legs regulated to a hair's-breadth.—Bow Compasses are compasses having the two legs united by a bow passing through one of them, the distance between the legs being adjusted by means of a screw and nut.—Proportional Compasses are compasses used for reducing or enlarging drawings, having the legs crossing so as to present a pair on each side of a common pivot. By means of a slit in the legs, and the movable pivot, the relative distances between the points at the respective ends may be adjusted at pleasure in the required proportion.

**COMPLEXION**, the color or hue of the skin, particularly of the face. The color depends partly on pigment in the deep cells of the epidermis and partly on the blood supply. The nature and color of the hair seems closely connected with the complexion, and these combined are important distinguishing marks of different races. See Ethnology.

**COMPLUTENSIAN POLYGLOT**, a celebrated polyglot edition of the Bible published at Complutum, the ancient name of Alcala de Henares, in Spain, 1514-17, by Cardinal Ximenes. See Polyglot.

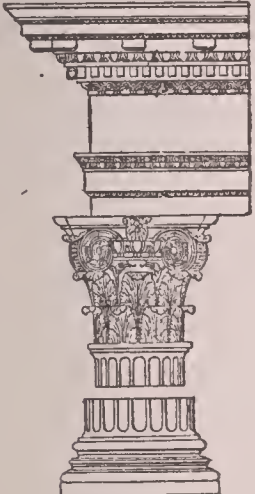
**COMPOSITÆ**, the largest known nat. order of plants, containing over 12,000 described species of herbs or shrubs distributed all over the world. The flowers (generally called florets) are numerous (with few exceptions) and sessile, forming a close head on the dilated top of the receptacle, and surrounded by an involucre of whorled bracts. The head of numerous florets was called by the older botanists a compound flower, hence the name. Many are common weeds, like the daisy, dandelion, thistle, etc.; many are cultivated in gardens, such as the asters, marigold, etc.; others have some economic or medicinal value, as chicory, artichoke, chamomile, lettuce, wormwood, arnica, etc.

**COMPOSITE ORDER**, in arch. the last of the five orders; so called because the capital belonging to it is composed out of those of the other orders, borrowing a quarter-round from the Tuscan and Doric, a row of leaves from the Corinthian, and volutes from the Ionic. Its cornice has simple modil-



lions of dentils. It is called also the Roman or the Italic order.

**COMPOSITION OF FORCES AND MOTIONS**, in mechanics, the union or assemblage of several forces or motions that are oblique to one another, into an equivalent force or motion in another direction. Thus two forces acting in the directions of the adjacent sides of a parallelogram, compose one force acting in the direction of the diagonal, and if the lengths of the adjacent sides represent also the magnitudes of the forces, the diagonal will represent the magnitude of the compound force or resultant.



Composite order.

**COMPOSITION WITH CREDITORS**, an arrangement whereby a debtor who has failed, compromises with all or a number of his creditors who agree to discharge him from his indebtedness for a percentage of their claims. If the arrangement be made secretly it is held to be void.

**COMPOUND ANIMALS**, animals, many of which by no means belong to the lowest types, in which individuals, distinct as regards many of the functions of life, are yet connected by some part of their frame so as to form a united whole. Such are the polyzoa and some of the ascidia.

**COMPOUNDING A FELONY**, the act of agreeing not to prosecute a person accused of a crime for a consideration of value. In the United States compounding a felony is punishable by imprisonment and a fine.

**COMPRESSED AIR**, atmospheric air compressed by means of pumps, etc., and used in driving stationary and locomotive engines, and excavating machines; as also in working pneumatic dispatch-tubes, railway-brakes, etc.

**COMPRESSED-AIR ENGINE**, an engine operated by the escape of air from a tank in which atmospheric air has been stored under high pressure.

**COMPRESSED-AIR LOCOMOTIVE**, a locomotive in which the motive power is compressed air. Many devices for this kind of locomotive have been invented but none of them have stood the practical tests through which they have been put. Compressed air motors have been tried on the street car lines of New York and other cities with small success.

**COMPRESSED-AIR TREATMENT**, atmospheric pressure brought to bear on the body for the purpose of curing diseases. It is applied by causing the patient to breathe compressed air, or to exhaust the air from a cabinet in which his body is placed, while he breathes the ordinary air through a tube communicating with the outside. It has not been successful.

**COMPRESSIBILITY**, the property of bodies in virtue of which they may be pressed into smaller bulk. All bodies are probably compressible, though the liquids are but slightly so. The gases are exceedingly compressible, and may be liquefied by pressure and cold combined. Those bodies which occupy their former space when the pressure is removed, are called elastic.

**COMSTOCK**, Anthony, an American reformer, noted for his detestation of improper literature. He was born in Connecticut in 1844, and served during the civil war on the Union side. Comstock organized the society for the suppression of vice, in 1873, and has done much to suppress immoral literature.

**COMSTOCK LODE**, a famous vein of gold and silver ore in Nevada (Storey county) in the Sierra mountains. It was discovered in 1859, is about four miles long and 2900 feet at its widest part. In 30 years the vein has produced \$350,000,000. Its greatest production in any one year was \$38,000,000 in 1877.

**COMTE** (kont), Isidore Auguste Marie François Xavier, founder of the "positive" system of philosophy, was born at Montpellier on 12th January, 1798, died at Paris 1857. In 1826 Comte commenced a course of lectures on positive philosophy, but only four lectures were given when he became deranged in mind, and did not recover till the end of 1827. In 1830 he commenced the publication of his *Cours de Philosophie Positive*, which was completed in six volumes in 1842. In 1845 he made the acquaintance of Clotilde de Vaux, who seems to have inspired him with a depth and tenderness of moral and æsthetic feeling before unknown in him. This appears in his second great work, *Positive Polity* (1851-54); the *Positivist Catechism* (1852); and his last work, *Subjective Synthesis* (1855). In his *Religion of Humanity* he himself assumed the office of high-priest, performing marriage and funeral rites on behalf of the disciples who had been induced to adopt his system. These, however, were never very numerous; and as a practical faith his system is now stationary, though as a philosophy of knowledge it is widely accepted. His works have been made known to American readers mainly by Mr. G. H. Lewes' *Comet's Philosophy of the Sciences* and Miss Martineau's translation above mentioned.

**CONCAN**, a maritime subdivision of Hindustan, in the presidency of Bombay. Area about 13,500 sq. miles; pop. about 3,000,000.

**CONCAVE**, hollow and curved or rounded, as the inner surface of a spherical body. A surface is concave when straight lines drawn from point to point in it fall between the surface

and the spectator; and convex when the surface comes between him and such lines.

**CONCEALMENT**, in law the hiding of facts bearing upon a crime, or the hiding of property in litigation, or of persons.

**CONCEPCION**, a seaport of Chili, capital of a province of the same name. Concepcion was founded in 1550, and has suffered much from earthquakes and attacks by the Araucanians. Pop. 55,458.

**CONCEPTION**, the act or power of conceiving in the mind; in philosophy, that mental act or combination of acts by which an absent object of perception is brought before the mind by the imagination.

**CONCEPTION**, Immaculate, in the Roman Catholic Church, the doctrine that the Virgin Mary was born without the stain of original sin. This doctrine came into favor in the 12th century, when, however, it was opposed by St. Bernard, and it afterward became a subject of vehement controversy between the Scotists, who supported, and the Thomists, who opposed it. In 1708 Clement XI. appointed a festival to be celebrated throughout the church in honor of the immaculate conception. Since that time it was received in the Roman Church as an opinion, but not as an article of faith until the year 1854, when the pope issued a bull which makes the immaculate conception a point of faith.

**CONCERT**, a public or private musical entertainment, at which a number of vocalists or instrumentalists, or both, perform singly or combined.

**CONCERTINA**, a musical instrument invented by Professor Wheatstone, the principle of which is similar to that of the accordion. It is composed of a bellows, with two faces or ends, generally polygonal in shape, on which are placed the various stops or studs, by the action of which air is admitted to the free metallic reeds which produce the sounds.

**CONCERTO** (kon-cher'tō), in music, a kind of composition, usually in a symphonic form, written for one principal instrument, with accompaniments for a full orchestra.

**CONCERT PITCH**. See Pitch.

**CONCH** (kongk), a marine shell, especially a large spiral shell of a trumpet shape, and which may be blown as a trumpet, as is the practice in Hindustan and some of the Pacific Islands.

**CONCHOL'OGY**, the science of shells, that department of zoology which treats of the nature, formation, and classification of the shells with which the bodies of many mollusca are protected; or the word may be used also to include a knowledge of the animals themselves, in which case it is equivalent to malacology. In systems of conchology shells are usually divided into three orders, Univalves, Bivalves, and Multivalves, according to the number of pieces of which they are composed.

**CONCORD**, in music, the combination of two or more sounds pleasing to the ear. Concords are the octave, the fifth, third, and sixth. The two first are called perfect, because as concords they



are not liable to any alteration by sharps or flats. The two last are called imperfect, as being alterable.

**CONCORD**, the capital of New Hampshire, on the Merrimac, 60 miles n.n.w. Boston, one of the largest rail-



State capitol, Concord, N. H.

way centers in New England. It has manufactures of carriages, hardware, cutlery, woolen fabrics, paper, etc. Pop. 21,632.

**CONCOR'DANCE**, a book in which the principal words used in any work or number of works, as the Scriptures, Shakspeare, Milton, Tennyson, Homer, etc., are arranged alphabetically, and the book, chapter, and verse, or act, scene, line, or other subdivision in which each word occurs, are noted; designed to assist an inquirer in finding any passage by means of any leading word which he can recollect, or to show the character of the language and style of any writer.

**CON'CRETE**, a technical term in logic, applied to an object as it exists in nature, invested with all its attributes, or to the notion of such an object. Concrete is opposite to abstract. The names of individuals are concrete; those of classes, abstract. A concrete name is a name which stands for a thing; an abstract name is a name which stands for the attribute of a thing.

**CON'CRETE**, a composition used in building, consisting of hydraulic or other mortar mixed with gravel or stone chippings about the size of a nut. It is used extensively in building under water, for example, to form the bottom of a canal or sluice, or the foundation of any structures raised in the sea; and it is also frequently used to make a bed for asphalt pavements, or to form foundations for buildings of any kind. It is sometimes even used as the material with which the walls of houses are built, the concrete being firmly rammed into molds of the requisite shape, and then allowed to set.

**CONCU'BINAGE**, sexual cohabitation of a man without legal marriage. It was permitted among the ancient Hebrews and the Greeks without limitation; but among the Romans in the case of unmarried men concubinage was limited to a single concubine of mean descent.

**CONCURRENT JURISDICTION**, the jurisdiction of different courts author-

ized to take cognizance of the same kind of case. In criminal cases the court which first takes up a case has the right of prevention, that is, of deciding upon that case exclusive of the other courts which but for that right would have been equally entitled to take cognizance of it. In civil cases it lies with the suitor to bring his cause before any court he pleases, which is competent to take it up.

**CONCUSSION OF THE BRAIN**, a term applied to certain injuries of the brain resulting from blows and falls, though unattended with fracture of the skull. Stupor or insensibility, sickness, impeded respiration, and irregular pulse are the first symptoms, and though these may subside there is always for a time more or less risk of serious inflammation of the brain setting in.

**CONDE**, Louis de Bourbon, founder of the house of, born 1530; killed after battle of Jarnac, 1569. See Bourbon.

**CONDE**, Louis de Bourbon, Prince of (the Great Condé), a famous general, born in 1621. In 1641 he married a niece of Cardinal Richelieu. His defeat of the Spanish at Rocroi, in 1643, was followed, in 1645, by his defeat of Mercy at Nordlingen, and by his capture of Dunkirk in 1646, the year in which he inherited his father's title. During the troubles of the Fronde he at first took the side of the court; but believing himself to be ill requited by Mazarin, he put himself at the head of the faction of the Petits Maîtres, and was imprisoned for a year by Mazarin (1650). On his release he at once put himself at the head of a new Fronde, entered upon negotiations with Spain, and, his attack on Paris being indecisive, retired to the Netherlands, where he was appointed generalissimo of the Spanish armies. In this capacity he unsuccessfully besieged Arras in 1654; but he was more fortunate at Valenciennes in 1656, and at Cambrai in 1657. In 1658 he was defeated before Dunkirk by Turenne, but was restored to his rank in France after the peace of 1659. In 1668 he accomplished the reduction of Franche Comté in three weeks; and in 1674 he defeated the Prince of Orange at Senef. His successes over Monteculi in Alsace in 1675 closed his military career. Four years later he retired to Chantilly, near Paris, and died at Fontainebleau in 1687.

**CONDENSATION**, in chemistry and physics, the act of reducing a gas or vapor to a liquid or solid form. Surface condensation, a mode of condensing steam by bringing it in contact with cold metallic surfaces in place of by injecting cold water.

**CONDENSED MILK**, milk preserved by evaporating part of its moisture, mixing with refined powdered sugar, and packing in air-tight cans hermetically sealed: the sugar may also be omitted.

**CONDENSER**, an apparatus for reducing the volume of a gas, or for reducing a gas to a liquid, or a liquid to a solid. Condensers are used in steam engines to condense the exhaust, and on shipboard for the purpose of supplying the boilers.

**CONDENSER**, an electric apparatus used to collect electricity and to store

it. The Leyden jar is a classic example of a condenser. The electricity is collected by brushes and passed into the jar. Another form of condenser is the Franklin plate, consisting of a glass plate with strips of tin foil on the sides.

**CONDENSING STEAM-ENGINE**. See Steam-engine.

**CONDILLAC** (kōn-dē-yāk), Etienne Bonnot de, French philosopher, born in 1715. His essay on the Origin of Human Knowledge (1746), in large part a polemic against abstract methods of philosophizing, struck the key-note of his system, and his Treatise on Systems, (1749) continued the condemnation of all systems not evolved from experience, from sensation. In 1754 appeared his Treatise on Sensation, and in 1755 his Treatise on Animals, a criticism on Buffon. The sagacity and clearness of his writings led to his appointment as tutor to the nephew of Louis XV., the infant Duke of Parma, for whom he wrote in 1755 his Cours d'Etudes, including a grammar, The Art of Writing, The Art of Reasoning, The Art of Thinking, and a general history. His work Commerce and Government appeared in the same year as the Wealth of Nations (1776), and was no unworthy companion to it. In 1768 he was elected to the Academy. He died shortly after the publication of his Logic in 1780, his work on Calculus being published posthumously in 1798.

**CONDONATION**, in law, forgiveness of injury. In an action for divorce on the ground of adultery it is a legal plea in defense.

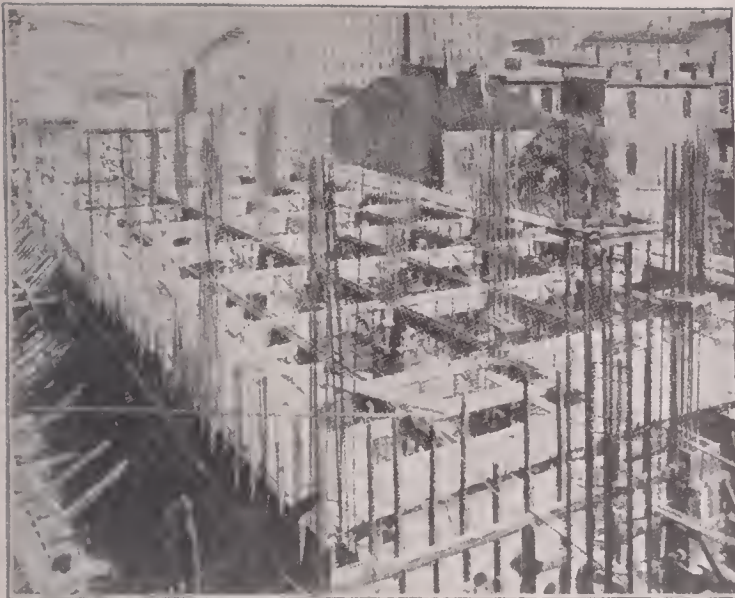
**CONDOR**, a South American bird, one of the largest of the Vulturidæ or vulturine birds. In its essential features it resembles the common vultures, differing from them mainly in the large



Condor.

cartilaginous caruncle which surmounts its beak, and in the large size of its oval and longitudinal nostrils placed almost at the extremity of the cere. Despite the many stories of its gigantic proportions, Humboldt met with no specimens whose wings exceeded 9 feet in expanse, though it has occasionally been known to attain an expanse of 14 feet. It is found in greatest numbers in the Andes chain, frequenting regions from 10,000 to 15,000 feet above the level of the sea, where they breed, depositing their two white eggs on the bare rock. They are generally to be seen in groups of three or four, and only descend to the plains under stress of hunger, when they will successfully attack sheep, goats, deer, and bullocks. They prefer carrion, however, and, when they have opportunity gorge themselves until they





VIEW OF WOOD CENTERING—SECOND FLOOR



SITE WITH PORTIONS OF COLUMNS ERECTED



METHOD OF FLOOR CONSTRUCTION



FIRST FLOOR SHOWING COMPLETED COLUMN  
AND GIRDER CONSTRUCTION



THE COMPLETED BUILDING



EXTERIOR VIEW OF INCOMPLETED BUILDING

REINFORCED CONCRETE CONSTRUCTION





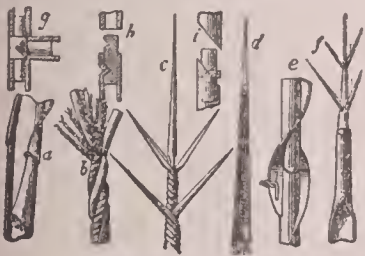


become incapable of rising from the ground.

**CONDORCET** (kon-dor-sā), Marie Jean Antoine Nicolas de Caritat, Marquis de, an eminent French writer, born in 1743. At the age of twenty-one he presented to the Academy of Sciences an *Essai Sur le Calcul Intégral*, and in 1767 his *Mémoire on The Problem of Three Points* appeared, both being afterward united under the title of *Essays on Analysis*. The merit of this work gained for him in 1769 a seat in the Academy of Sciences, of which, after the publication of his *Eulogies of Academicians*, who died previously to 1699, (1773), he was appointed perpetual secretary (1777). In 1777 his *Theory of Comets* gained the prize offered by the Academy of Berlin; he enriched the transactions of many learned societies; and took an active part in the *Encyclopédie*. During the troubles of the first French revolution his sympathies were strongly engaged on the side of the people. The fall of the Girondist party, May 31, 1793, prevented the constitution which Condorcet had drawn up from being accepted, and as he freely criticised the constitution which took its place he was denounced as being an accomplice of Brissot. Madame Verney, a woman of noble feelings, secreted him for eight months, during which he wrote his *Sketch of an Historic Picture of the Progress of the Human Spirit*. Lest he should endanger her safety, however, he left the house secretly in opposition to her wishes, fled from Paris, and wandered about till arrested and thrown into prison, where, March 28, 1794, he was found dead on the floor, having apparently swallowed poison.

**CONDUCTION.** See Heat.

**CONDUCTOR, or LIGHTNING CONDUCTOR**, an instrument by means of which either the electricity of the clouds, the cause of lightning, is conducted without explosion into the earth, or the lightning itself is received and conducted quietly into the earth or water without injuring buildings, ships, etc. It was invented by Benjamin Franklin



Lightning-conductor.

abc, Various forms of rods. cdf, Various forms of tips. ghi, Various forms of attachments.

about 1752, and met with speedy general adoption, the first conductor in England being erected in 1762. It usually consists of a stout iron rod with one or more points at the top, the lower end being metallically connected with thick strips of copper which are carried into the ground to a considerable depth and terminated, if possible, in water or in wet earth. Various other forms of conductors have been introduced, such as are shown in the accompanying cut, where a is a conductor consisting of

metallic strips joined together, b a conductor of copper wires intertwined with iron rods, e a conductor consisting of a metallic strip forming a tube with spiral flanges. Various kinds of tips are also in use, as will be seen in the cut, d being formed of several metals inclosed the one within the other, the most fusible being outside; g, h, i show how in some cases successive sections of rods are connected.

**CONDUIT** (kun'dit), a line of pipes or an underground channel of some kind for the conveyance of water.

**CONE**, as used in geometry, generally means a right circular cone, which may be defined as the solid figure traced out when a right-angled triangle is made to revolve round one of the sides that contain the right angle. A more comprehensive definition may be given as follows:—Let a straight line be held fixed at one point, and let any other point of the line be made to describe any closed curve which does not cut itself; the solid figure traced out is a cone. When the curve which the second point describes is a circle, the cone is a right circular cone. The cubical content of a right circular cone is one-third of that of a cylinder on the same base and of the same altitude, and is therefore found by multiplying the area of the base by the altitude, and taking one-third of the product. See also Conic Sections.

**CONE**, in botany, a dry compound fruit, consisting of many open scales, each with two seeds at the base, as in the conifers; a strobilus.

**CONEY ISLAND**, a small island 9 miles southeast of New York, at the west end of Long Island, a favorite summer bathing resort, having a fine beach, splendid hotels, and numerous other attractions and accommodations for visitors.

**CONFECTIONERY**, an edible substance made principally from sugar and including what is generally called candy. Confections were formerly used chiefly as vehicles for medicine and were made by druggists or medicine venders. Since their manufacture on a large scale began in the last century they have been adulterated with various substances injurious to health, such as coal tar colors, clay, etc. The value of confectionery products in the United States amounts to \$70,000,000 or more annually.

**CONFEDERACY**, United Daughters of the, a society of women patriots formed in 1894 at Nashville, Tenn., for the perpetuation of the memory of the part which the women of the South took in the civil war. It is organized into state divisions and has a membership of over 30,000.

**CONFEDERATE STATES**, the name given to eleven of the Southern States of America, which attempted to secede from the Union on the election of Abraham Lincoln, the abolitionist candidate, to the presidency in November, 1860, thus leading to the great civil war which lasted till 1865. See United States.

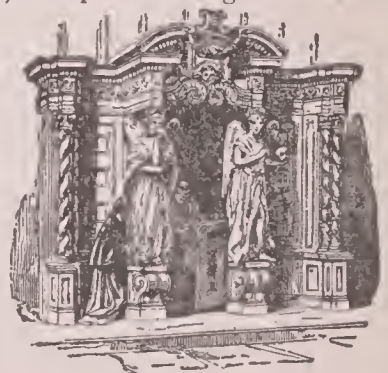
**CONFEDERATE VETERANS**, United, an organization of former soldiers of the Confederate army, founded at New Orleans in 1889, for social, patriotic,

and historical purposes. It has a membership of nearly 70,000 and publishes a periodical, *The Confederate Veteran*, which is the official organ of the society.

**CONFERENCE**, (1) a meeting of the representatives of different foreign countries for the discussion of some question. (2) A meeting between delegates of the two houses of parliament called to discuss the provisions of a bill with regard to which they are disagreed, with the object of effecting an agreement between them. (3) The annual meetings of Wesleyan preachers for deliberation on the affairs of the body.

**CONFESSION**, Auricular, in the strictest sense, the disclosure of sins to the priest at the confessional, with a view to obtain absolution for them. The person confessing is allowed to conceal no sin of consequence which he remembers to have committed, and the father confessor is bound to perpetual secrecy. The practice of a public acknowledgment of great sins was altered by Pope Leo the Great, in 450, into a secret one before the priest, and the Fourth General Lateran council (1215) ordained that every one of the faithful, of both sexes, come to years of discretion, should privately confess all their sins at least once a year to their own pastor, an ordination still binding on members of the R. Catholic Church. Confession is a part of the sacrament of penance.

**CONFESSIONAL**, in Roman Catholic churches and chapels, a kind of inclosed seat in which the priest sits to hear persons confess their sins. The confessional is often not unlike a sentry-box, the priest sitting within and the



Confessional, cathedral of St. Gudule, Brussels.

penitent kneeling without and speaking through an aperture. Many confessionals are in three divisions or compartments, the center, which is for the reception of the priest, being closed half-way up by a dwarf door, and having a seat within it. The side compartments, which communicate with the center by grated apertures, are for the penitents.

**CONFIDENTIAL COMMUNICATION**, in law, a communication made by one person to another which the latter cannot be compelled to give in evidence as a witness. Generally all communications made between a client and his agent, between the agent and the counsel in a suit, or between the several parties to a suit, are treated as confidential. The privilege of confidentiality does not extend to disclosures made to a medical adviser, and in England it has been

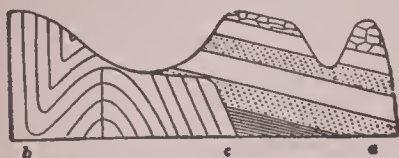


decided also that confessions made to a priest are not to be treated as confidential.

**CONFIRMATION**, the ceremony of laying on of hands by a bishop in the admission of baptized persons to the enjoyment of Christian privileges, the person confirmed then taking upon himself the baptismal vows made in his name. In the Roman Catholic churches a delay of 7 years is interposed after baptism, in the Lutheran from 13 to 16, and in the English Church from 14 to 18, though in the latter there is no fixed period. The Lord's Supper is not taken by these sects until after confirmation.

**CONFISCATION**, the act of condemning as forfeited, and adjudging to the public treasury, the goods of a criminal in part punishment of a crime.

**CONFORMABLE**, in geol., lying in parallel or nearly parallel planes, and



Conformable strata *a* and *b*, unconformable at *c*

having the same dip and changes of dip; said of strata, the opposite term being unconformable.

**CONFUCIUS**, or **KONG-FU-TSE**, that is, "the teacher, Kong," the famous Chinese sage, born about 550 B.C. in the province of Shantung. The deaths of his favorite disciples Yen Hwin and Tze-lu in 481 and 478 did much to further his own, which took place in the latter year. Confucius left no work detailing his moral and social system, but the five canonical books of Confucianism are the *Yih-king*, the *Shu-king*, the *Shi-king*, the *Le-king*, and the *Chun-tsien*, with which are grouped the "Four Books," by disciples of Confucius, the *Ta-héu* or *Great Study*, the *Chung-Yung* or *Invariable Mean*, the *Tun-yu* or "Philosophical Dialogues," and the *Hi-tse*, written by Meng-tse or Mencius. The teaching of Confucius has had, and still has, an immense influence in China, though he can hardly be said to have founded either a religion or a philosophy. All his teaching was devoted to practical morality and to the duties of man in this world in relation to his fellow-men; in it was summed up the wisdom acquired by his own insight and experience, and that derived from the teaching of the sages of antiquity. It is doubtful if he had any real belief in a personal god.

**CONGENITAL DISEASE**, a disease with which one is afflicted at the time of birth, not necessarily an inherited disease, although most inherited diseases are congenital. Many congenital diseases are due to defects of the mother or to accidental causes during the term of pregnancy.

**CONGER-EEL** (*kong'gér*), a genus of marine eels characterized by a long dorsal fin beginning near the nape of the neck, immediately above the origin of the pectoral fins, and by having the upper jaw longer than the lower.

**CONGESTION**, in medicine, an excessive accumulation of blood in an

organ, which thereby becomes disordered. Among the causes of congestion are the different periods of development of the human body, each of which renders some particular organ unusually active; diseased conditions; and the accidental exertions of certain organs. Again, if the current of blood to one organ is checked the blood tends to accumulate in another; and the vessels which bring back the blood to the heart—that is the veins—are sometimes obstructed, as by external pressure, by tumors, etc. Congestion sometimes lasts a short time only; but if not early cured, and its return, which would otherwise be frequent, prevented, it is only the beginning of other diseases. Sometimes it terminates in bleeding, which is a remedy for it; sometimes it increases into inflammation; sometimes it becomes a chronic disease, that is, the blood accumulates for a long time and expands the veins, the expansion becomes permanent, and dropsy may result.

**CONGLOMERATE**, a term applied by geologists to rocks consisting mostly of water-worn pebbles cemented together by a matrix of siliceous, calcareous, or other cement.

**CONGO**, or **ZAIRE**, one of the great rivers of the world, in Southern Africa, having its embouchure in the South Atlantic. It carries more water to the ocean than the Mississippi, its volume being next to that of the Amazon. Its total length is perhaps 3000 miles. Its chief tributaries are the Aruwimi and the Mobangi from the right, and the Ikelemba and Kwa from the left, which latter represents the collected waters of immense rivers from the south, such as the Kassai, the Kwango, etc. It is navigable for about 110 miles from its mouth, after which the navigation is interrupted by cataracts.

**CONGO FREE STATE**, a state recently founded on the river Congo, in Central South Africa, stretching by a kind of narrow neck of territory to the river's mouth, but expanding inland so as to cover an immense area, mainly lying south of the river. The central government is at Brussels, consisting of the King of Belgium as sovereign, and three departmental chiefs. In Africa there is a governor-general with many officials, and an armed force. The revenue is partly from funds provided by King Leopold. A number of stations have been formed on the river, the chief of which is Boma, 70 miles from its mouth. The chief exports are palm oil and kernels, caoutchouc, ivory, copal, ground-nuts, wax, etc. From Matadi, opposite Vivi, a railway has been laid to Stanley Pool, and steamers have been placed on the river. Area estimated at 900,000 sq. miles; pop. at 8,000,000 to 40,000,000.

**CONGO PEA**. See Pigeon Pea.

**CONGREGATIONALISTS**, a Christian sect claiming to continue the primitive form of church government. Each congregation is autonomous and wholly independent of extraneous jurisdiction, the union of Congregational churches having only such indirect authority as attends the cumulative expression of opinion. In doctrine the majority

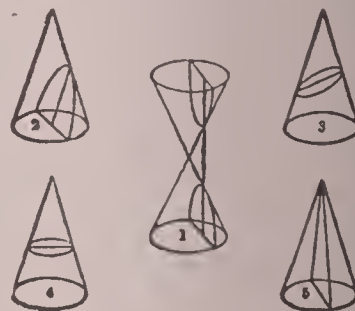
are evangelical, though in individual churches considerable latitude is shown.

**CONGRESS**, generally speaking a meeting of international representatives for the purpose of considering particular or general questions concerning international politics, art, science, economy, or religion. A series of world's congresses were held at the Chicago World's Fair in 1893. International treaty congresses will be found described under their separate heads.

**CONGRESS**, the name given to the legislative assembly of the U. States, consisting of two houses—a senate and a house of representatives. The senate consists of two members elected by each state for a period of six years, one-third of whom are elected every two years. The representatives in the lower house are elected by the several states every two years, and their number varies in each state in proportion to the population as determined by the decennial census. The united body of senators and representatives for the two years during which the representatives hold their seats is called one congress. See United States.

**CONGRESSMAN AT LARGE**, a member of the U. States house of representatives who is elected by the votes of all of the people of a state and not by a single district. They are elected to provide for the excess of population until the state can be regularly redistricted.

**CONIC SECTIONS**, three curves, the hyperbola, the parabola, and the ellipse, so called because they are formed by the intersection of the surface of a cone with planes that cut the cone in various



Conic sections.

directions. If the cutting-plane be parallel to the axis the curve formed is the hyperbola (1); if parallel to the slope of the cone the curve is a parabola (2); if passing through both sides of the cone obliquely the section is an ellipse (3). A section perpendicular to the axis of the cone forms a circle (4), which may also be considered one of the conic sections. A perpendicular plane through the apex gives a triangle (5).

**CONIFERÆ**, the pines, firs, and their allies, the essential character of which consists in the manner in which the ovules, not inclosed in an ovary, receive directly the action of the pollen without the intervention of a stigma. The ovules in these plants are borne on scales or modified leaves, which are spread out, not folded, and generally grouped in such a manner as to form a cone composed of a greater or smaller number of these leaves, of which only a portion may be fertile and bear ovules.



**CONJUGAL RIGHTS**, in law, the right which husband and wife have to each other's society, comfort, and affection. A suit for restitution of conjugal rights is competent by either party.

**CONJUGATION**. See Verb.

**CONJUNCTION**, in grammar, a connective indeclinable particle serving to unite words, sentences, or clauses of a sentence, and indicating their relation to one another. They are classifiable into two main groups: (1) Coordinating conjunctions, joining independent propositions, and subdivisible into copulative, disjunctive, adversative, and illative conjunctions; (2) Subordinating conjunctions, linking a dependent or modifying clause to the principal sentence. The only active influence which the conjunction can be said to exercise grammatically in a sentence is in respect of the mood of the verb following it in dependent sentences, the rule being to employ the subjunctive where futurity and contingency are implied, the indicative where they are not; as "I will do it, though he be there" (which he may or may not be); or "I will do it, though he is there" (which he is).

**CONJUNCTION**, in astronomy, the position of two of the heavenly bodies, as two planets, or the sun and a planet, when they have the same longitude (are in the same direction from the earth). When it is simply said that a planet is in conjunction, conjunction with the sun is to be understood. Superior conjunction and inferior conjunction are terms used of the planets whose orbits are nearer to the sun than that of the earth, according as the sun is between us and them, or they between us and the sun.

**CONJURING**. See Legerdemain.

**CONKLING**, Roscoe, an American senator and orator, born in Albany, N.Y., in 1829, died in 1888. He was admitted to the bar in 1850 and was early in the political field as a stump-speaker. He was several times elected congressman, up to 1867, and his ability as a debater and orator won him great fame. At 38 he was elected U. States senator and soon became one of the foremost leaders of the republican party. In 1876 he appeared as a presidential candidate, opposed civil service reform, and in 1880 led the movement to nominate Grant for a third time. He quarreled with Garfield for appointing anti-Conkling men to federal offices and soon afterward retired from active politics to the practice of law. Conkling was a very positive man, strong in his friendships and enmities and his work was for the most part ephemeral.

**CONNAUGHT** (kon'nat), the smallest of the four provinces of Ireland, situated between Leinster and the Atlantic; area, 4,392,086 acres. A large proportion of the province is bog, and, generally it is the least fertile of all of the provinces. It is divided into five counties—Galway, Mayo, Roscommon, Leitrim, and Sligo. Pop. 649,635.

**CONNECTICUT** (kon-net'i-kut), a river, U. States, the west branch of which forms by treaty the boundary between the U. States and Canada to lat. 45° n. It rises on the north border of New Hampshire; forms the boundary

between Vermont and New Hampshire passes through the west part of Massachusetts and the central part of Connecticut, and falls into Long Island Sound. It is navigable for vessels drawing from 8 to 10 feet for about 300 miles from its mouth, subsidiary canals, however, being required above Hartford; total length, 450 miles. It is famed for its shad fisheries.

**CONNECTICUT**, one of the original thirteen states of the American Union; bounded by New York, Massachusetts, Rhode Island, and Long Island Sound; length, east to west, about 95 miles; greatest breadth, north to south, about 72 miles; area, 4845 sq. miles. It contains several distinct ranges of hills, but none of them have any great elevation. Its principal river is the Connecticut, which divides it into two nearly equal parts. The coast is indented with numerous bays and creeks which furnish many harbors. In former geologic times the area of Connecticut is believed to have formed a part of the southern slope of a great mountain mass, whose summits are perhaps indicated by the present White, Green, and Adirondack mountains. Long-continued erosion of



Connecticut seal.

streams and perhaps of ice reduced this region to a plain, with low relief and shallow stream valleys. A comparatively recent tilting of the land has slightly depressed the coast and elevated the interior. This has revived the cutting power of the streams, which are now actively eroding their valleys, most of them in hard rocks, in which slow progress is made. The Connecticut Valley is, however, largely of relatively softer rocks, which have been eroded away with greater rapidity. In recent geologic times the area of the state was covered by the Laurentian glacier, which did much erosion and deposition, scouring out lake basins, and thus forming the multitude of little lakes and ponds which diversify the surface, and modifying the streams' courses, producing rapids and falls, now utilized for water-power.

Among the highest points in Connecticut are Bear Mountain, 2355 feet; Gridley Mountain, 2200 feet; Riga Mountain, all in Salisbury; Bradford Mountain, in Canaan, 1927; Dutton Mountain, 1620 feet, and Mount Ball,

1760, in Norfolk; Above All Mountain, 1456, in Warren; Ivy Mountain, in Goshen, 1640 feet; and Ellsworth Hill, 1580 feet, in Sharon. Its minerals comprise iron, copper, lead, cobalt, plumbago, marble, free-stone, porcelain-clay, and coal. Lime is produced in large quantities, and there is abundance of building stone. The soil is in general better suited for grazing than tillage, abounding in fine meadows. But where agriculture is practiced there are ample crops of Indian corn, rye, wheat, oats, barley, buckwheat, potatoes, hay, tobacco, etc.; and fruits, particularly apples, flourish. Connecticut is notably a manufacturing state, 19.5 per cent of the total population being engaged in that industry. Though one of the smallest states of the Union, it ranks eleventh in the importance of its manufactures. Influential among the factors which have developed these interests have been the favorable geographical location and the excellence of the land and water communication of the state, the water power afforded by its streams, and especially the inventive talents and industrious habits of its people.

By the twelfth census the state surpassed any other state in 11 important industries, producing 75 per cent in value of the total ammunition output of the country; 56 per cent of the brass manufactures; 63 per cent of the clocks; 47 per cent of the hardware; 76 per cent of the plated and britannia ware; 64 per cent of the needles and pins. The development of its manufactures has been consistent. The cotton-mills of the state are clustered on the streams that flow into the Thames at Norwich. The principal exports consist of agricultural produce and manufactures. The foreign commerce is nearly all carried on through New York and Boston, but there is a considerable coasting trade, and a large amount of tonnage engaged in the cod-fisheries. Fish-culture has received special attention, many millions of shad ova and young salmon having been introduced into the rivers. The state is intersected in various directions by railways. The chief educational institution is Yale University, one of the most celebrated in the world. Connecticut is divided into eight counties; Hartford is the capital. The state at first consisted of two colonies—Connecticut, with its seat of government at Hartford; and New Haven, at New Haven. Connecticut was settled in 1633 by emigrants from Massachusetts. Hartford was settled by English in 1635, the Dutch having previously built a fort there. The colony of New Haven was settled by English in 1637, and the two colonies were united in 1665 by a charter granted by Charles II. In national elections the state went Democratic in 1888 and 1892; in 1896, 1900, 1904, 1908, Republican. Pop. 1,000,000.

**CONNECTIVE TISSUE**. See Areolar Tissue.

**CONNEMARA** ("the Bays of the Ocean"), a boggy and mountainous district occupying the west portion of county Galway, Ireland; about 30 miles in length and 15 to 20 miles in breadth. Its coasts are broken, and there are nu-



merous small lakes. It is subdivided into Connemara Proper in the west, Jar-Connaught in the south, and Joyce Country in the north.

**CONRAD II.**, king of Germany and emperor of the Romans, reigned from 1024 to 1039, and is regarded as the true founder of the Franconian or Salic line.

**CONRAD III.**, king of Germany, and emperor of the Romans from 1138 to

and is performed by a bishop; (3) the act of the priest in celebrating the eucharist by which the elements are solemnly dedicated to their sacred purpose.

**CONSENT**, in law, is understood to be a free and deliberate act of a rational being. It is invalidated by any undue means—intimidation, improper influence, or imposition—used to obtain it.



Scene in Connemara—Going to market.

1152, was the founder of the Suabian dynasty of Hohenstaufen. His marriage with a Greek princess led to his adoption of the double-headed eagle now appearing on the Austrian arms. He was succeeded by his nephew Frederick Barbarossa.

**CONSANGUINITY**, the relation of persons descended from the same ancestor. It is either lineal or collateral—lineal between father and son, grandfather and grandson, and all persons in the direct line of ancestry and descent, from one another; collateral between brothers, cousins, and other kinsmen descended from a common ancestor, but not from one another.

**CONSCIENCE**, that power or faculty, or combination of faculties, which decides on the rightness and wrongness of actions; otherwise called the Moral Sense.

**CONSCIOUSNESS**, a term used in various senses, most commonly perhaps to denote the mind's knowledge or cognizance of its own action.

**CONSCRIPTION**, the enlisting of the inhabitants of a country capable of bearing arms, by a compulsory levy, at the pleasure of the government, being thus distinguished from recruiting, or voluntary enlistment. In Great Britain and the U. States a small militia obtained, if necessary, by conscription is usually kept up in time of peace, but the rule is voluntary enlistment.

**CONSECRATION**, the dedication with certain rites or ceremonies of a person or thing to the service of God; especially (1) the ordination of a bishop or archbishop, which requires the co-operation of at least three bishops; (2) the dedication of a church to God's service, which is practiced in the Anglican and Roman Catholic churches

Idiots, pupils, etc., cannot give legal consent; neither can persons in a state of absolute drunkenness, though partial intoxication will not afford legal ground for annulling a contract.

**CONSERVATION OF ENERGY.** See Energy, Conservation of.

**CONSERVATORY**, a name given to a systematic school of musical instruction.

**CONSERVATORY**, in gardening, a term generally applied by gardeners to plant-houses, in which the plants are raised in a bed or border without the use of pots, the building being frequently attached to a dwelling-house.

**CONSERVE**, a form of medicine in which flowers, herbs, fruits, roots, are preserved as nearly as possible in their natural fresh state.

**CONSIGNMENT**, a mercantile term which means either the sending of goods to a factor or agent for sale, or the goods so sent.

**CONSISTORY**, the highest council of state in the Papal government. The name is also applied to the court of every diocesan bishop, held in their cathedral churches for the trial of ecclesiastical causes arising within the diocese. In the English Church the consistory is held by the bishop's chancellor or commissary and by archdeacons and their officials either in the cathedral church or other convenient place in the diocese.

**CONSOLE**, in architecture, a projecting ornament or bracket having for its contour generally a curve of contrary flexure. It is employed to support a cornice, bust, vase, or the like, but is frequently used merely as an ornament.

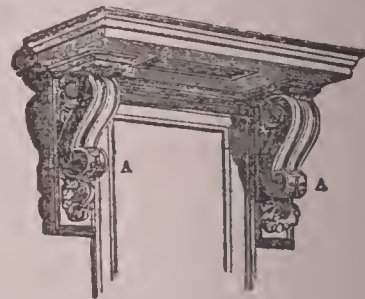
**CONSOLS**, or **CONSOLIDATED ANNUITIES**, a public stock forming the greater portion of the national debt of Great Britain. It was formed in 1751

by an act consolidating several separate stocks bearing interest at 3 per cent into one general stock. At the period when the consolidation took place the principal of the funds united amounted to \$45,000,000; but through the addition of other loans it has increased so much that now, after considerable reductions, it still amounts to more than half of the national debt. The interest of about five million pounds is payable in Dublin, that of the remainder in London.

**CONSONANCE**, in music, an agreeable accord of sounds, such as the third, fifth, and octave. See Concord.

**CONSONANT**, a letter so named as being sounded only in connection with a vowel, though some consonants have hardly any sound even when united with a vowel, serving merely to determine the manner of beginning or ending the vowel sounds; as in ap, pa, at, ta. In uttering a consonant there is greater or less contact of some parts of the organs of speech; in uttering a vowel there is a want of such contact, the vocal passage being open though variously modified. They are classed as liquids, mutes, sibilants, labials, dentals, palatals, gutturals, etc.

**CONSPIRACY**, in law, an offense ranked as a misdemeanor, and punishable by imprisonment and hard labor. It is constituted by a combination between several persons to carry into effect any purpose injurious either to individuals, particular classes, or the community at large. When the conspiracy leads to any overt act of an unlawful kind, the offense becomes felony.



Cornice supported by Consoles. A A.

**CONSTABLE**, in the common modern acceptance of the term constables are police officers in towns, counties, etc., having as their duties the repression of felonies, the keeping of the peace, the execution of legal warrants, etc. In case of special disturbance a certain number of private citizens may be sworn in as special constables.

**CONSTANTINE**, Caius Flavius Valerius Aurelius Claudius, Roman emperor, surnamed the Great, son of the Emperor Constantius Chlorus, was born A.D. 274. After the death of his father he was chosen emperor by the soldiery, in the year 306, and took possession of the countries which had been subject to his father, namely, Gaul, Spain, and Britain. In the campaign in Italy he saw, it is said, the vision of a flaming cross in the heavens, beneath the sun, bearing the inscription, "In hoc signo vinces." Under the standard of the cross, therefore, he vanquished the army of Maxentius under the walls of Rome, and entered the city in triumph.



In 313, together with his son-in-law, the eastern emperor, Licinius, he published the memorable edict of toleration in favor of the Christians, and subsequently declared Christianity the religion of the state. Licinius, becoming jealous of his fame, twice took up arms against him, but was on each occasion defeated, and finally put to death. Thus



Constantine.

in 325 Constantine became the sole head of the Roman Empire. His internal administration was marked by a wise spirit of reform, and by many humane concessions with regard to slaves, accused persons, widows, etc. In 329 he laid the foundation of a new capital of the empire, at Byzantium, which was called after him Constantinople, and soon rivalled Rome herself. In 337 he was taken ill near Nicomedia, was baptized, and died after a reign of thirty-one years, leaving his empire between his three sons, Constantine, Constantius, and Constans.

**CONSTANTINOPLE**, a celebrated city of Turkey in Europe, capital of the Turkish Empire, situated on a promontory jutting into the Sea of Mar-



mora, having the Golden Horn, an inlet of the latter, on the north and the Bosphorus on the east. The city proper is thus surrounded by water on all sides excepting the west, where is an ancient and lofty double wall of 4 miles in length, stretching across the promontory. On the opposite side of the Golden Horn are Galata, Pera, and other

suburbs, while on the Asiatic side of the Bosphorus entrance is Skutari. Occupying the extreme point of the promontory on which the city stands is the seraglio or palace of the sultan, which, with its buildings, pavilions, gardens, and groves, includes a large space. At the principal entrance is a large and lofty gate, called Bab Humayum, "the high door" or "sublime porte," from which has been derived the well-known diplomatic phrase. Of the 300 mosques, the most remarkable are the royal mosques, of which there are about fifteen, esteemed the finest in the world. First among these is the mosque of St. Sophia, the most ancient existing Christian church, converted into a mosque in 1453 on the capture of the city by the Turks. Another magnificent mosque is that of Soliman; after which are those of the Sultana Valide, built by the mother of Mohammed IV., and of Sultan Achmet, the most conspicuous object in the city when viewed from the Sea of Marmora. The harbor, the Golden Horn, which more resembles a large river than a harbor, is deep, well-sheltered, and capable of containing 1200 large ships, which may load and unload alongside the quays. It is about 6 miles long, and a little more than half a mile broad at the widest part. Among the imports are corn, timber, cotton stuffs, and other manufactured goods. The exports consist of silk, carpets, hides, wool, goats'-hair, valonia, etc. —Constantinople occupies the site of the ancient Byzantium, and was named after Constantine the Great, who rebuilt it about A.D. 330. It was taken in 1204 by the Crusaders, who retained it till 1261; and by the Turks under Mohammed II., May 29, 1453—an event which completed the extinction of the Byzantine Empire. See Byzantine Empire and Byzantium. Pop. 1,125,000.

**CONSTELLATIONS** are the groups into which astronomers have divided the fixed stars, and which have received names for the convenience of description and reference. It is plain that the union of several stars into a constellation, to which the name of some animal, person or inanimate object is given must be entirely arbitrary, since the several points (the stars) may be united in a hundred different ways, just as imagination directs. The grouping adopted by the Egyptians was accordingly modified by the Greeks, though they retained the Ram, the Bull, the Dog, etc.; and the Greek constellations were again modified by the Romans and again by the Arabians. Ptolemy enumerated forty-eight constellations, which are still called the Ptolemaean. They are the following:—1. The twelve signs of the zodiac (see Zodiac). 2. Twenty-one constellations found in the northern hemisphere—the Great Bear (Ursa Major), the Little Bear (Ursa Minor), Perseus, the Dragon, Cepheus, Cassiopeia, Andromeda, Pegasus, Equulus (Horse's Head), the Triangle, the Wagoner (Auriga), Boötes, the Northern Crown (Corona Borealis), Ophiuchus, the Serpent (Serpentarius), Hercules, the Arrow (Sagitta), the Lyre, the Swan (Cygnus), the Dolphin, the Eagle

(Aquila). 3. Fifteen constellations in the southern hemisphere—Orion, the Whale (Cetus), Eridanus, the Hare (Lepus), the Great Dog (Canis Major), the Little Dog (Canis Minor), Hydra, the Cup (Crater), the Crow (Corvus), the Centaur, the Wolf (Lupus), the Altar (Ara), the Southern Fish (Piscis Australis), the Argo, the Southern Crown (Corona Australis). Others were subsequently added, this being especially rendered necessary by the increased navigation of the southern hemisphere, and now the different groups of stars have come to be associated with all sorts of animals and objects, including the Camelopard, the Fly, the Air-pump, the Compasses, etc. The different stars of a constellation are marked by Greek letters, a denoting those of the first magnitude,  $\beta$  those of the second, and so on. Stars of the sixth magnitude are the smallest visible to the naked eye. Several stars have also particular names.

**CONSTIPATION**, the undue retention of feces. Its immediate effects are disordered appetite, a dry coated or clammy tongue, thirst, or a disagreeable taste in the mouth, dullness, giddiness, or pain in the head, torpor, irritability, and despondency. Its less immediate effects are cutaneous affections, dyspepsia, colic, hysteria, hemorrhoids, etc. In most cases it is produced by indigestible food, astringent and stimulating drinks, sedentary habits, excessive indulgence in sleep, etc. The immediate use of purgatives, followed by strict attention to regimen, is in many cases all that is necessary.

**CONSTITUTION**, the fundamental law of a state, whether it be a written instrument of a certain date, as that of the United States or an aggregate of laws and usages which have been formed in the course of ages, like the English constitution. The ideal constitution is that established by a free sovereign people for their own regulation, though the expediency of other forms at various stages of national development cannot but be recognized. The chief of these are:—1. Constitutions granted by the plenary power of absolute monarchs, or constitutions octroyées; such as Louis XVIII.'s Charte. 2. Those formed by contract between a ruler and his people, the contract being mutually binding—a class under which, in a great degree, the British constitution must be placed. 3. Those formed by a compact between different sovereign powers, such as the constitutions of the German Empire, of the United Provinces of Holland, and of the Swiss Confederation.

In regard to political principles, constitutions are: 1. Democratic, when the fundamental law guarantees to every citizen equal rights, protection, and participation, direct or indirect, in the government, such as the constitutions of the United States and of some cantons of Switzerland. 2. Aristocratic, when the constitution recognizes privileged classes, as the nobility and clergy, and intrusts the government entirely to them, or allows them a very disproportionate share in it. Such a constitution was that of Venice, and such at one time those of some Swiss cantons, for instance, Bern. 3. Of a mixed character.



To this latter division belong some monarchical constitutions, which recognize the existence of a king whose power is modified by other branches of government of a more or less popular cast. The British constitution belongs to this division.

**CONSTITUTIONAL LAW**, a branch of law which has to do with the organization of government, the soundness of statutory law in relation to the principles of a state's constitution, and with the power of a government over its citizens or subjects. In the United States the interpretation of the constitution is open to all courts but the Supreme Court of the United States has the final jurisdiction in all questions of the federal constitution while the supreme courts of the several states have final jurisdiction over all questions concerned with the constitutions of the separate states themselves.

**CONSTITUTION OF THE UNITED STATES**, the organic law of the United States. The constitution was drawn up by a constitutional convention which began its work on May 14, 1787, in Independence Hall, Philadelphia. The work was finished on Sept. 17, 1787, and was ratified by all the thirteen states by 1790. Several amendments have been made to the constitution to meet the exigencies of national growth. The following is a complete transcript of the constitution as it exists today:

**CONSTITUTION OF THE UNITED STATES.**

We, the people of the United States, in order to form a more perfect union, establish justice, insure domestic tranquillity, provide for the common defense, promote the general welfare, and secure the blessings of liberty to ourselves and our posterity, do ordain and establish this Constitution for the United States of America.

Article I., Sec. 1. All legislative powers herein granted shall be vested in a congress of the United States, which shall consist of a senate and house of representatives.

Sec. 2. The house of representatives shall be composed of members chosen every second year by the people of the several states, and the electors in each state shall have the qualifications requisite for electors of the most numerous branch of the state legislature.

No person shall be a representative who shall not have attained to the age of twenty-five years, and been seven years a citizen of the United States, and who shall not, when elected, be an inhabitant of that state in which he shall be chosen.

Representatives and direct taxes shall be apportioned among the several states which may be included within this Union according to their respective numbers, which shall be determined by adding to the whole number of free persons, including those bound to service for a term of years, and excluding Indians not taxed, three-fifths of all other persons. The actual enumeration shall be made within three years after the first meeting of the congress of the United States, and within every subsequent term of ten years, in such manner as they shall by law direct. The

number of representatives shall not exceed one for every thirty thousand, but each state shall have at least one representative; and until such enumeration shall be made, the state of New Hampshire shall be entitled to choose 3; Massachusetts, 8; Rhode Island and Providence Plantations, 1; Connecticut, 5; New York, 6; New Jersey, 4; Pennsylvania, 8; Delaware, 1; Maryland, 6; Virginia, 10; North Carolina, 5; South Carolina, 5; and Georgia, 3.

When vacancies happen in the representation from any state, the executive authority thereof shall issue writs of election to fill such vacancies.

The house of representatives shall choose their speaker and other officers; and shall have the sole power of impeachment.

Sec. 3. The senate of the United States shall be composed of two senators from each state, chosen by the legislature thereof, for six years; and each senator shall have one vote.

Immediately after they shall be assembled in consequence of the first election, they shall be divided as equally as may be into three classes. The seats of the senators of the first class shall be vacated at the expiration of the second year, of the second class at the expiration of the fourth year, and of the third class at the expiration of the sixth year, so that one-third may be chosen every second year; and if vacancies happen by resignation, or otherwise, during the recess of the legislature of any state, the executive thereof may make temporary appointments until the next meeting of the legislature, which shall then fill such vacancies.

No person shall be a senator who shall not have attained to the age of thirty years, and been nine years a citizen of the United States, and who shall not, when elected, be an inhabitant of that state for which he shall be chosen.

The vice-president of the United States shall also be president of the senate, but shall have no vote, unless they be equally divided.

The senate shall choose their other officers, and also a president pro tempore, in the absence of the vice-president or when he shall exercise the office of president of the United States.

The senate shall have the sole power to try all impeachments; when sitting for that purpose, they shall be on oath or affirmation. When the president of the United States is tried, the chief justice shall preside; and no person shall be convicted without the concurrence of two-thirds of the members present.

Judgment in cases of impeachment shall not extend further than to removal from office, and disqualification to hold and enjoy any office of honor, trust, or profit under the United States; but the party convicted shall nevertheless be liable and subject to indictment, trial, judgment, and punishment, according to law.

Sec. 4. The times, places, and manner of holding elections for senators and representatives shall be prescribed in each state by the legislature thereof; but the congress may at any time, by law, make or alter such regulations, ex-

cept as to the places of choosing senators.

The congress shall assemble at least once in every year, and such meeting shall be on the first Monday in December unless they shall, by law, appoint a different day.

Sec. 5. Each house shall be the judge of the elections, returns, and qualifications of its own members, and a majority of each shall constitute a quorum to do business; but a smaller number may adjourn from day to day, and may be authorized to compel the attendance of absent members, in such manner and under such penalties as each house may provide.

Each house may determine the rules of its proceedings, punish its members for disorderly behavior, and, with the concurrence of two-thirds, expel a member.

Each house shall keep a journal of its proceedings and from time to time publish the same, excepting such parts as may in their judgment require secrecy, and the yeas and nays of the members of either house on any question shall, at the desire of one-fifth of those present, be entered on the journal.

Neither house, during the sessions of congress, shall, without the consent of the other, adjourn for more than three days, nor to any other place than that in which the two houses shall be sitting.

Sec. 6. The senators and representatives shall receive a compensation for their services, to be ascertained by law, and paid out of the treasury of the United States. They shall in all cases, except treason, felony, and breach of the peace, be privileged from arrest during their attendance at the sessions of their respective houses, and in going to and returning from the same; and for any speech or debate in either house they shall not be questioned in any other place.

No senator or representative shall, during the time for which he was elected, be appointed to any civil office under the authority of the United States, which shall have been created, or the emoluments whereof shall have been increased during such time; and no person holding any office under the United States shall be a member of either house during his continuance in office.

Sec. 7. All bills for raising revenue shall originate in the house of representatives; but the senate may propose or concur with amendments, as on other bills.

Every bill which shall have passed the house of representatives and the senate shall, before it become a law, be presented to the president of the United States; if he approve, he shall sign it; but if not, he shall return it, with his objections, to that house in which it shall have originated, who shall enter the objections at large on their journal, and proceed to reconsider it. If after such reconsideration two-thirds of that house shall agree to pass the bill, it shall be sent, together with the objections to the other house, by which it shall likewise be reconsidered; and if approved by two-thirds of that house, it shall become a law. But in all such cases the votes of both houses shall be determined by yeas



and nays, and the names of the persons voting for and against the bill shall be entered on the journal of each house respectively. If any bill shall not be returned by the president within ten days (Sunday excepted) after it shall have been presented to him, the same shall be a law in like manner as if he had signed it, unless the congress by their adjournment prevent its return; in which case it shall not be a law.

Every order, resolution, or vote to which the concurrence of the senate and the house of representatives may be necessary (except on a question of adjournment) shall be presented to the president of the United States; and before the same shall take effect, shall be approved by him, or, being disapproved by him, shall be repassed by two-thirds of the senate and house of representatives, according to the rules and limitations prescribed in the case of a bill.

Sec. 8. The congress shall have power to lay and collect taxes, duties, imposts, and excises, to pay the debts and provide for the common defense and general welfare of the United States; but all duties, imposts, and excise shall be uniform throughout the United States;

To borrow money on the credit of the United States;

To regulate commerce with foreign nations, and among the several states, and with the Indian tribes;

To establish an uniform rule of naturalization, and uniform laws on the subject of bankruptcies throughout the United States;

To coin money, regulate the value thereof, and of foreign coin, and fix the standard of weights and measures;

To provide for the punishment of counterfeiting the securities and current coin of the United States;

To establish post-offices and post-roads;

To promote the progress of science and useful arts, by securing for limited times, to authors and inventors, the exclusive right to their respective writings and discoveries;

To constitute tribunals inferior to the supreme court;

To define and punish piracies and felonies committed on the high seas, and offenses against the law of nations;

To declare war, grant letters of marque and reprisal, and make rules concerning captures on land and water;

To raise and support armies, but no appropriation of money to that use shall be for a longer term than two years;

To provide and maintain a navy;

To make rules for the government and regulation of the land and naval forces;

To provide for calling forth the militia to execute the laws of the Union, suppress insurrections, and repel invasions;

To provide for organizing, arming, and disciplining the militia, and for governing such part of them as may be employed in the service of the United States, reserving to the states respectively the appointment of the officers, and the authority of training the militia according to the discipline prescribed by congress;

To exercise exclusive legislation in all cases whatsoever over such district (not exceeding ten miles square) as may, by

cession of particular states, and the acceptance of congress, become the seat of the government of the United States, and to exercise like authority over all places purchased by the consent of the legislature of the state in which the same shall be, for the erection of forts, magazines, arsenals, dock-yards, and other needful buildings; and

To make all laws which shall be necessary and proper for carrying into execution the foregoing powers, and all other powers vested by this constitution in the government of the United States, or in any department or officer thereof.

Sec. 9. The migration or importation of such persons as any of the states now existing shall think proper to admit shall not be prohibited by congress prior to the year one thousand eight hundred and eight; but a tax of duty may be imposed on such importation, not exceeding ten dollars for each person.

The privilege of the writ of habeas corpus shall not be suspended, unless when in cases of rebellion or invasion the public safety may require it.

No bill of attainder or ex post facto law shall be passed.

No capitation or other direct tax shall be laid, unless in proportion to the census or enumeration hereinbefore directed to be taken.

No tax or duty shall be laid on articles exported from any state.

No preference shall be given by any regulation of commerce or revenue to the ports of one state over those of another; nor shall vessels bound to or from one state be obliged to enter, clear, or pay duties in another.

No money shall be drawn from the treasury but in consequence of appropriations made by law; and a regular statement and account of the receipts and expenditures of all public money shall be published from time to time.

No title of nobility shall be granted by the United States; and no person holding any office of profit or trust under them shall, without the consent of the congress, accept of any present, emolument, office, or title, of any kind whatever, from any king, prince, or foreign state.

Sec. 10. No state shall enter into any treaty, alliance, or confederation; grant letters of marque and reprisal; coin money; emit bills of credit; make anything but gold and silver coin a tender in payment of debts; pass any bill of attainder, ex post facto law, or law impairing the obligation of contracts, or grant any title of nobility.

No state shall, without the consent of the congress, lay any imposts or duties on imports or exports, except what may be absolutely necessary for executing its inspection laws; and the net produce of all duties and imposts, laid by any state on imports or exports, shall be for the use of the treasury of the United States; and all such laws shall be subject to the revision and control of the congress.

No state shall, without the consent of congress, lay any duty of tonnage, keep troops, or ships of war in time of peace, enter into any agreement or compact with another state, or with a foreign

power, or engage in war, unless actually invaded, or in such imminent danger as will not admit of delay.

Article II., Sec. 1. The executive power shall be vested in a president of the United States of America. He shall hold his office during the term of four years, and, together with the vice-president, chosen for the same term, be elected as follows:

Each state shall appoint, in such manner as the legislature thereof may direct, a number of electors, equal to the whole number of senators and representatives to which the state may be entitled in the congress; but no senator or representative, or persons holding an office of trust or profit under the United States, shall be appointed an elector.

The congress may determine the time of choosing the electors, and the day on which they shall give their votes; which day shall be the same throughout the United States.

No person, except a natural-born citizen or a citizen of the United States at the time of the adoption of the constitution, shall be eligible to the office of president; neither shall any person be eligible to that office who shall not have attained at the age of thirty-five years, and been fourteen years resident within the United States.

In case of the removal of the president from office, or of his death, resignation, or inability to discharge the powers and duties of the said office, the same shall devolve on the vice-president, and the congress may by law provide for the case of removal, death, resignation or inability, both of the president and vice-president, declaring what officer shall then act as president, and such officer shall act accordingly, until the disability be removed, or a president shall be elected.

The president shall, at stated times, receive for his services a compensation, which shall neither be increased nor diminished during the period for which he shall have been elected, and he shall not receive within that period any other emolument from the United States, or any of them.

Before he enters on the execution of his office, he shall take the following oath or affirmation: "I do solemnly swear (or affirm) that I will faithfully execute the office of president of the United States, and will, to the best of my ability, preserve, protect, and defend the constitution of the United States."

Sec. 2. The president shall be commander-in-chief of the army and navy of the United States, and of the militia of the several states when called into the actual service of the United States; he may require the opinion, in writing, of the principal officer in each of the executive departments upon any subject relating to the duties of their respective offices, and he shall have power to grant reprieves and pardons for offenses against the United States, except in cases of impeachment.

He shall have power, by and with the advice and consent of the senate, to make treaties, provided two-thirds of the senators present concur; and he shall nominate, and by and with the advice and consent of the senate, shall



appoint ambassadors, other public ministers and consuls, judges of the supreme court, and all other officers of the United States, whose appointments are not herein otherwise provided for, and which shall be established by law; but the congress may by law vest the appointment of such inferior officers as they think proper in the president alone, in the courts of law, or in the heads of departments.

The president shall have power to fill up all vacancies that may happen during the recess of the senate, by granting commissions which shall expire at the end of their next session.

Sec. 3. He shall from time to time give to the congress information of the state of the Union, and recommend to their consideration such measures as he shall judge necessary and expedient; he may on extraordinary occasions convene both houses, or either of them, and in cases of disagreement between them, with respect to the time of adjournment, he may adjourn them to such time as he shall think proper; he shall receive ambassadors and other public ministers; he shall take care that the laws be faithfully executed, and shall commission all the officers of the United States.

Sec. 4. The president, vice-president, and all civil officers of the United States, shall be removed from office on impeachment for, and conviction of, treason, bribery, or other high crimes and misdemeanors.

Article III., Sec. 1. The judicial power of the United States shall be vested in one supreme court, and in such inferior courts as the congress may from time to time ordain and establish. The judges, both of the supreme and inferior courts, shall hold their offices during good behavior, and shall, at stated times, receive for their services a compensation, which shall not be diminished during their continuance in office.

Sec. 2. The judicial power shall extend to all cases, in law and equity, arising under this constitution, the laws of the United States, and treaties made, or which shall be made, under their authority; to all cases affecting ambassadors, other public ministers, and consuls; to all cases of admiralty and maritime jurisdiction; to controversies to which the United States shall be a party; to controversies between two or more states; between a state and citizens of another state; between citizens of different states; between citizens of the same state claiming lands under grants of different states, and between a state, or the citizens thereof, and foreign states, citizens, or subjects.

In all cases affecting ambassadors, other public ministers, and consuls, and those in which a state shall be party, the supreme court shall have original jurisdiction. In all the other cases before mentioned, the supreme court shall have appellate jurisdiction, both as to law and fact, with such exceptions and under such regulations as the congress shall make.

The trial of all crimes, except in cases of impeachment, shall be by jury; and such trial shall be held in the state where the said crimes shall have been committed; but when not committed within

any state, the trial shall be at such place or places as the congress may by law have directed.

Sec. 3. Treason against the United States shall consist only in levying war against them, or in adhering to their enemies, giving them aid and comfort.

No person shall be convicted of treason unless on the testimony of two witnesses to the same overt act, or on confession in open court.

The congress shall have power to declare the punishment of treason; but no attainder of treason shall work corruption of blood, or forfeiture except during the life of the person attainted.

Article IV., Sec. 1. Full faith and credit shall be given in each state to the public acts, records, and judicial proceedings of every other state. And the congress may by general laws prescribe the manner in which such acts, records, and proceedings shall be proved, and the effect thereof.

Sec. 2. The citizens of each state shall be entitled to all privileges and immunities of citizens in the several states.

A person charged in any state with treason, felony, or other crime, who shall flee from justice, and be found in another state, shall, on demand of the executive authority of the state from which he fled, be delivered up, to be removed to the state having jurisdiction of the crime.

No person held to service or labor in one state, under the laws thereof, escaping into another, shall in consequence of any law or regulation therein, be discharged from such service or labor, but shall be delivered up on claim of the party to whom such service or labor may be due.

Sec. 3. New states may be admitted by the congress into this Union; but no new state shall be formed or erected within the jurisdiction of any other state, nor any state be formed by the junction of two or more states, or parts of states, without the consent of the legislatures of the states concerned as well as of the congress.

The congress shall have power to dispose of and make all needful rules and regulations respecting the territory or other property belonging to the United States; and nothing in this constitution shall be so construed as to prejudice any claims of the United States, or any particular state.

Sec. 4. The United States shall guarantee to every state in this Union a republican form of government, and shall protect each of them against invasion, and, on application of the legislature, or of the executive (when the legislature cannot be convened), against domestic violence.

Article V. The congress, whenever two-thirds of both houses shall deem it necessary, shall propose amendments to this constitution, or, on the application of the legislatures of two-thirds of the several states, shall call a convention for proposing amendments, which, in either case, shall be valid to all intents and purposes as part of this constitution, when ratified by the legislatures of three-fourths of the several states, or by conventions in three-fourths thereof, as the one or the other mode of ratification

may be proposed by the congress; provided, that no amendment which may be made prior to the year one thousand eight hundred and eight shall in any manner affect the first and fourth clauses in the ninth section of the first article; and that no state, without its consent, shall be deprived of its equal suffrage in the senate.

Article VI. All debts contracted and engagements entered into before the adoption of this constitution shall be as valid against the United States under this constitution, as under the confederation.

This constitution and the laws of the United States which shall be made in pursuance thereof, and all treaties made, or which shall be made, under the authority of the United States, shall be the supreme law of the land; and the judges in every state shall be bound thereby, anything in the constitution or laws of any state to the contrary notwithstanding.

The senators and representatives before mentioned, and the members of the several state legislatures, and all executive and judicial officers, both of the United States and of the several states, shall be bound by oath or affirmation to support this constitution; but no religious test shall ever be required as a qualification to any office or public trust under the United States.

Article VII. The ratification of the conventions of nine states shall be sufficient for the establishment of this constitution between the states so ratifying the same.

Done in convention, by the unanimous consent of the states present, the 17th day of September, in the year of our Lord one thousand seven hundred and eighty-seven, and of the independence of the United States of America the twelfth.

## AMENDMENTS.

Article I. Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech or of the press; or the right of the people peaceably to assemble, and to petition the government for redress of grievances.

Article II. A well-regulated militia being necessary to the security of a free state, the right of the people to keep and bear arms shall not be infringed.

Article III. No soldier shall, in time of peace, be quartered in any house without the consent of the owner, nor in time of war but in a manner to be prescribed by law.

Article IV. The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated; and no warrants shall issue but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the persons or things to be seized.

Article V. No person shall be held to answer for a capital or otherwise infamous crime, unless on a presentment or indictment of a grand jury, except in cases arising in the land or naval forces, or in the militia, when in actual



service, in time of war and public danger; nor shall any person be subject for the same offense to be twice put in jeopardy of life or limb, nor shall be compelled in any criminal case to be a witness against himself; nor to be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use without just compensation.

Article VI. In all criminal prosecutions, the accused shall enjoy the right to a speedy and public trial, by an impartial jury of the state and district wherein the crime shall have been committed, which district shall have been previously ascertained by law, and to be informed of the nature and cause of the accusations; to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favor, and to have the assistance of counsel for his defense.

Article VII. In suits at common law, where the value in controversy shall exceed twenty dollars, the right of trial by jury shall be preserved, and no fact tried by a jury shall be otherwise re-examined in any court of the United States than according to the rules of the common law.

Article VIII. Excessive bail shall not be required, nor excessive fines imposed nor cruel and unusual punishment inflicted.

Article IX. The enumeration in the constitution of certain rights shall not be construed to deny or disparage others retained by the people.

Article X. The powers not delegated to the United States by the constitution, nor prohibited by it to the states, are reserved to the states respectively, or to the people.

Article XI. The judicial power of the United States shall not be construed to extend to any suit in law or equity commenced or prosecuted against one of the United States by citizens of another state, or by citizens or subject of any foreign state.

Article XII. The electors shall meet in their respective states, and vote by ballot for president and vice-president, one of whom at least shall not be an inhabitant of the same state with themselves. They shall name in their ballots the person voted for as president, and in distinct ballots the person voted for as vice-president; and they shall make distinct lists of all persons voted for as president, and of all persons voted for as vice-president, and of the number of votes for each, which lists they shall sign and certify, and transmit, sealed, to the seat of the government of the United States, directed to the president of the senate. The president of the senate shall, in the presence of the senate and house of representatives, open all the certificates, and the votes shall then be counted; the person having the greatest number of votes for president shall be the president, if such number be a majority of the whole number of electors appointed; and if no person have such a majority, then from the persons having the highest numbers, not exceeding three, on the list of those voted for as president, the house of representatives shall choose immediately, by ballot, the

president. But in choosing the president, the votes shall be taken by states, the representation from each state having one vote; a quorum for this purpose shall consist of a member or members from two-thirds of the states, and a majority of all the states shall be necessary to a choice. And if the house of representatives shall not choose a president, whenever the right of choice shall devolve upon them, before the fourth day of March next following, then the vice-president shall act as president, as in the case of the death or other constitutional disability of the president. The person having the greatest number of votes as vice-president shall be the vice-president, if such number be a majority of the whole number of electors appointed; and if no person have a majority, then from the two highest numbers on the list the senate shall choose the vice-president; a quorum for the purpose shall consist of two-thirds of the whole number of senators, and a majority of the whole number shall be necessary to a choice. But no person constitutionally ineligible to the office of president shall be eligible to that of vice-president of the United States.

Article XIII., Sec. 1. Neither slavery nor involuntary servitude, except as a punishment for crime whereof the party shall have been duly convicted, shall exist within the United States, or any place subject to their jurisdiction.

Sec. 2. Congress shall have power to enforce this article by appropriate legislation.

Article XIV., Sec. 1. All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States, and of the state wherein they reside. No state shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any state deprive any person of life, liberty, or property without due process of law, nor deny to any person within its jurisdiction the equal protection of the laws.

Sec. 2. Representatives shall be apportioned among the several states according to their respective numbers, counting the whole number of persons in each state, excluding Indians not taxed. But when the right to vote as any election for the choice of electors for president and vice-president of the United States, representatives in congress, the executive and judicial officers of a state, or the members of the legislature thereof, is denied to any of the male inhabitants of such state being twenty-one years of age, and citizens of the United States, or in any way abridged, except for participation in rebellion or other crime, the basis of representation therein shall be reduced in the proportions which the number of such male citizens shall bear to the whole number of male citizens twenty-one years of age in such state.

Sec. 3. No person shall be a senator or representative in congress, or elector of president and vice-president, or hold any office, civil or military, under the United States, or under any state, who, having previously taken an oath as a member of congress, or as an officer of

the United States, or as a member of any state legislature, or as an executive or judicial officer of any state, to support the constitution of the United States, shall have engaged in insurrection or rebellion against the same, or given aid or comfort to the enemies thereof. But congress may, by a vote of two-thirds of each house, remove such disability.

Sec. 4. The validity of the public debt of the United States authorized by law, including debts incurred for payment of pensions and bounties for services in suppressing insurrection or rebellion, shall not be questioned. But neither the United States nor any state shall assume or pay any debt or obligation incurred in aid of insurrection or rebellion against the United States, or any claim for the loss or emancipation of any slave; but all such debts, obligations, and claims shall be held illegal and void.

Sec. 5. The congress shall have power to enforce, by appropriate legislation, the provisions of this article.

Article XV., Sec. 1. The right of the citizens of the United States to vote shall not be denied or abridged by the United States, or by any state, on account of race, color, or previous condition of servitude.

Sec. 2. The congress shall have power to enforce this article by appropriate legislation.

**CONSUL**, a name originally given to the two highest magistrates in the republic of Rome. In the beginning of the republic the authority of the consuls was almost as great as that of the preceding kings. They could declare war, conclude peace, make alliances, and even order a citizen to be put to death; but their powers were gradually curtailed, especially by the establishment of the tribunes of the people, early in the 5th century. But they still stood at the head of the whole republic: all officers were under them, the tribunes of the people only excepted: they convoked the senate, proposed what they thought fit, and executed the laws. In times of emergency they received unlimited power, and could even sentence to death without trial, levy troops, and make war without the resolve of the people first obtained. Under the emperors the consular dignity sunk to a shadow, and became merely honorary. The last consul at Rome was Theodorus Paulinus (A.D. 536).

In France the name of consul was temporarily adopted for the chief magistrates after the revolution. As early as Aug. 2, 1802, Bonaparte was proclaimed first consul for life, and thus the constitution of France became again practically monarchical. On April 10, 1804, he was proclaimed emperor, and even the nominal consulate ended.

At present consuls are officials appointed by the government of one country to attend to its commercial interests in seaports or other towns of another country. The duties of a consul generally speaking are to promote the trade of the country he represents; to give advice and assistance when called upon to his fellow-subjects; to uphold their lawful interests and privileges if



any attempt be made to injure them; to transmit reports of trade to his own government, to authenticate certain documents, etc. They are generally of three ranks: consuls-general, consuls, and vice-consuls.

**CONSUMPTION**, or **PHTHISIS**, a disease known by emaciation, debility, cough, hectic fever, and purulent expectoration. The predisposing causes are very variable—hereditary taint, scrofulous diathesis, syphilis, small-pox, etc.; exposure to fumes and dusty air in certain trades; violent passions and excess of various kinds, sudden lowering of the temperature of the body, etc. The more immediate or occasional causes are pneumonic inflammation proceeding to suppuration, catarrh, asthma, and tubercles in the lungs, the last of which is by far the most general. The incipient symptoms usually vary with the cause of the disease; but when it arises from tubercles it is usually marked by a short dry cough that becomes habitual, but from which nothing is spit up for some time except a frothy mucus. The breathing is at the same time somewhat impeded, the body becomes gradually leaner, and great languor, with indolence, dejection, and loss of appetite prevail. At a later stage the cough becomes more troublesome, particularly by night, and is attended with an expectoration, the matter of which assumes a greenish color and purulent appearance, being on many occasions streaked with blood. In some cases a more severe degree of blood-spitting attends, and the patient spits up a considerable quantity of florid, frothy blood. At a more advanced period of the disease a pain is sometimes felt on one side in so high a degree as to prevent the person from lying easily on that side; but it more frequently happens that it is felt only on making a full inspiration, or coughing. At the first commencement of the disease the pulse is often natural, but it afterwards becomes full, hard, and frequent. At the same time the face flushes, particularly after eating, the palms of the hands and soles of the feet are affected with burning heat; the respiration is difficult and laborious; evening exacerbations become obvious, and by degrees the fever assumes the hectic form with remittent exacerbations twice every day, at noon and evening. From the first appearance of the hectic symptoms the urine is high colored, and deposits a copious branny red sediment. At this time the patient is usually costive; but in the more advanced stages a diarrhoea often comes on, colliquative sweats likewise break out, and these alternate with each other, and induce great debility. Some days before death the extremities become cold. In some cases a delirium precedes that event. The morbid appearance most frequently to be met with on the dissection of those who die of phthisis is the existence of tubercles in the cellular substance of the lungs, most usually at the upper and back part; but, in some instances, occupying the outer part, and forming adhesions to the pleura. In some cases life has been protracted till not one-twentieth part

of the lungs appeared, on dissection, fit for performing their function. The left lobe is oftener affected than the right. The diet in this disorder should be nutritious, but not heating, or difficult of digestion. Milk, especially that of the ass; farinaceous vegetables; acescent fruits; animal soups; and, above all, cod-liver oil, etc. are usually given. It is also of the utmost importance to see that the digestive organs are in proper working order. As much open air as possible, combined with abundance of nutritious food, is at present the treatment in vogue. With regard to urgent symptoms requiring palliation, the cough may be allayed by demulcents, but especially mild opiates swallowed slowly; colliquative sweats by acids, particularly the mineral; diarrhoea by chalk and other astringents, or by small doses of opium.

**CONTAGION**, the communication of disease by contact direct or indirect. A distinction has sometimes been made between contagion, as the communication of disease strictly by contact, and infection, as communication of disease by the miasmata, exhalations or germs which one body gives out and the other receives. There is little doubt that excessively minute disease germs proceed from the breath, the perspiration or other excretions of a diseased person, and are capable of propagating the disease in another person; but the true nature of these is little understood. Antiseptics, or disinfectants, are used to destroy the poisonous particles, such as carbolic acid, sulphur, permanganate of potash, chlorine gas, etc.

**CONTEMPT**, a term applied to an act of disobedience, impertinence, etc., to a judge or his mandates. It is really a crime and can be punished by the court as the court sees fit. Some American judges have tried to punish persons not connected with a law case who have criticized the conduct of the judge outside the court, but this power has never been legally established.

**CONTINENT**, a connected tract of land of great extent, forming a sort of whole by itself, as Europe, Asia, Africa, North and South America; or we may speak of the eastern and western continents, Europe, Asia, and Africa being regarded as one, and North and South America another. Australia, from its size, may also be regarded as a continent.

**CONTINENTAL SYSTEM**, a plan devised by Napoleon to exclude Britain from all intercourse with the continent of Europe. It began with the decree of Berlin of November 21, 1806, by which the British Islands were declared to be in a state of blockade; all commerce, intercourse, and correspondence were prohibited; every Briton found in France, or a country occupied by French troops, was declared a prisoner of war; all property belonging to Britons, fair prize, and all trade in goods from Britain or British colonies entirely prohibited. Britain replied by orders in council prohibiting trade with French ports, and declaring all harbors of France and her allies subjected to the same restrictions as if they were closely blockaded. Further decrees on the part

of France, of a still more stringent kind, declared all vessels of whatever flag, which had been searched by a British vessel or paid duty to Britain, denationalized, and directing the burning of all British goods, etc. These decrees caused great annoyance, and gave rise to much smuggling, till annulled at the fall of Napoleon, 1814.

**CONTRABAND**, in commerce, all goods and wares exported from or imported into any country, against the laws of said country. There are, also, a number of articles termed contraband of war which neutrals may be prevented, by one belligerent, from carrying to another. These generally include not only arms and munitions of war, but all the articles out of which they may be made. In recent times even provisions in certain cases have been considered contraband of war.

**CONTRACT**, in law, an agreement or covenant between two or more persons, in which each party binds himself to do or forbear some act, and each acquires a right to what the other promises. Contracts may be in express terms or implied from the acts of the parties; they may be verbal or written, and at common law both forms are binding; but by statute law a promise must be in writing. To be valid, a contract must be entered into by parties legally competent, that is, of sound mind and of full age. The act contracted for must not be contrary to law or public policy. Thus an agreement to do injury to another, or a contract not to marry at all is void. The contract must be founded on a consideration either of money or some act whereby an undoubted advantage accrues to the party sued. Lastly, the contract is voidable, if obtained by fraud, mistake or compulsion.

**CONTRALTO**, in music, the highest voice of a male adult, or the lowest of a woman or a boy, called also the alto, or when possessed by a man counter-tenor. It is next below the treble and above the tenor, its easy range being from tenor G to treble C.

**CONVENTION**, a coming together of persons delegated to act for others, or not so delegated, the purpose of which is to make agreements, treaties, nominations or elections for office, transact business of various kinds and to do other things that may seem desirable to the convention. Political conventions generally have to do with the machinery of politics not connected with the actual government of a state. The first national convention of a political party was that of the anti-masonic party in 1828. The idea immediately was adopted and today seems to form an inalienable and necessary part of American political procedure.

**CONVERSAZIONE** (sat-si-ō'ne), a reception, usually on a large scale and in the evening, at which the company move about, converse with their acquaintances, partake of tea, coffee, or other refreshments, and often have objects of art, science, or general interest set out for their inspection.

**CONVERSION**, a term in logic. A proposition is converted when the predicate is put in the place of the subject, and the subject in place of the predicate;



as, "no A is B" ("no virtuous man is a rebel"), the converse of which is "no B is A" ("no rebel is a virtuous man"). Simple conversion, however, in this manner is not always logical. In the case of universal affirmatives, for example, "all A are B" (say, "all men are animals"), the simple converse "all B are A" ("all animals are men") would not be true.

**CONVEX LENS.** See Lens.

**CONVEYANCING**, the practice of drawing deeds, leases, or other writings (conveyances) for transferring the title to property from one person to another, of investigating the title of the vendors and purchasers of property, and of framing those multifarious deeds and contracts which govern and define the rights and liabilities of families and individuals.

**CONVICT**, the general term for a person who has been found guilty of a serious offense and sentenced to penal servitude.

**CONVICTION**, the finding a person guilty of an offense by the verdict of a jury. In certain cases of minor offenses, such as are tried before justices of the peace, etc., the law allows of convictions without the intervention of a jury.

**CONVICT LABOR**, labor performed by felons, or other convicts, and especially a term applied to the labor of convicts the products of which are purchased by contractors at an annual payment. The convict labor plan has been bitterly opposed by labor unions as destructive to the interests of free labor and this view has been confirmed by experience. Convict labor, even when used for public purposes, such as road building, has been found expensive, undesirable and inefficient.

**CONVOLVULUS**, a genus of plants, consisting of slender twining herbs with milky juice; bell-shaped flowers and five free stamens.

**CONVULSION**, a diseased action of muscular fibers, known by violent and involuntary contractions of the muscular parts, with alternative relaxations. Convulsions are universal or partial, and have obtained different names according to the parts affected, or the symptoms. The muscles principally affected in all species of convulsions are those immediately under the direction of the will, as those of the eyelids, eye, face, jaws, neck, superior and inferior extremities. Convulsions are produced commonly by irritation of some part of the brain or spinal cord, such as the general convulsions in inflammation of the brain membranes, or of the nerves themselves. Children of a nervous temperament are often the subjects of convulsions during dentition, particularly when accompanied by a disordered state of the bowels or the presence of worms.

**CONWAY**, Moncure Daniel, an American author, clergyman, and historian. He was born in Virginia in 1832 and early allied himself with the abolitionist party and the Unitarian Church. In 1863 he went to England and resided there for 20 years. He recently returned to the United States. His principal works are *The Rejected Stone*, *Idols and Ideals*, *Demonology* and *Devil Lore*, and a number of literary essays.

**COOCH-BEHAR', or KUCH-BEHAR'**, a native state in India, in political relation with the government of Bengal. The greater portion of the soil is fertile and well-cultivated. Area, 1307 sq. miles; pop. 578,868.—The chief town, Cooch-Behar, contains some handsome public buildings and a splendid new palace of the Maharajah. Pop. 11,480.

**COOK**, Eliza, English poetess, born in London in 1818. She published a collection of poems under the title of *Melaia and Other Poems*. She afterward wrote a great many poems mostly of a lyric cast, and some of her songs have been highly popular. She died in 1889.

**COOK**, James, a famous British navigator, born in Yorkshire, 1728. In 1755 he entered the royal navy, and four years later as sailing-master of the *Mercury* performed valuable services in surveying the St. Lawrence River and



Captain Cook.

the coast of Newfoundland. Some observations on a solar eclipse, communicated to the Royal Society, brought him into notice, and he was appointed commander of a scientific expedition to the Pacific, with the rank of lieutenant in the navy. During this expedition he successively visited Tahiti, New Zealand, discovered New South Wales, and returned by the Cape of Good Hope to Britain in 1771. In 1772 Captain Cook, now raised to the rank of a commander in the navy, commanded a second expedition to the Pacific and Southern Oceans, which resulted like the former in many interesting observations and discoveries. He returned to Britain in 1774. Two years later he again set out on an expedition to ascertain the possibility of a north-west passage. On this voyage he explored the western coast of North America, and discovered the Sandwich Islands, on one of which, Hawaii, he was killed by the natives, February 14, 1779.

**COOK**, Joseph, an American clergyman and author, born in New York in 1838, died in 1901. For six years until 1880 he delivered his famous "Boston Monday Lectures" and subsequently toured the country as a lecturer.

**COOKE**, Jay, a noted American financier, born in Ohio in 1821. During the civil war he negotiated loans of

over \$2,000,000,000 for the government and was one of the most effective advocates of the present national banking system. He died in 1905.

**COOKE**, John Esten, an American novelist, born in Virginia in 1830, died in 1886. His literary career was interrupted by the civil war in which he took an active part. His principal works of fiction are *The Virginia Comedians*, and a sequel to that work, *The Story of Eagle's Nest*, *Leather Stocking and Silk*, *Ellie*, or *the Human Comedy*, and *Henry St. John, Gentleman*. He also wrote several works of history.

**COOKE**, Rose Terry, an American story writer and poet, born in Connecticut in 1827, died in 1892. She published *Poems* in 1860, *Steadfast* in 1889, *Happy Dodd* in 1879 and several collections of short stories which in their day were widely read.

**COOKERY**, the preparation of food so as to render it more palatable and more digestible. The art is of great importance, not only for comfort but also for health. Food is mainly prepared by submitting it to the action of fire, as by roasting, boiling, stewing, etc. These processes give each a different flavor to food, but result alike in rendering the tissues, both of animal and vegetable food, softer and much more easily dealt with by the digestive organs. The art of cookery was carried to considerable perfection among some of the ancient nations, as for instance the Egyptians, Persians, and Athenians. Extravagance and luxury at table were notable features of Roman life under the empire. Among moderns the Italians were the first to reach a high degree of art in this department. Their cooking, like that of the ancient Romans, is distinguished by a free use of oil. Italian cookery seems to have been transplanted by the princesses of the House of Medici to France, and was carried there to perhaps the highest degree of perfection; even yet the skill and resource which the French cook shows in dealing often with very slight materials is a highly creditable feature in the domestic economy of the nation.

**COOLEY**, Thomas McIntyre, an American jurist and author, born in New York in 1824, died in 1898. For several years he was a professor in the law school of the University of Michigan and from 1864 to 1885 an associate justice of the Supreme Court of Michigan. His various publications are authority on constitutional law.

**COOLIDGE**, Thomas Jefferson, an American diplomat, born at Boston in 1831. He served as United States minister to France in 1892 and served subsequently on the Canadian American Joint High Commission.

**COOLIE**, a name in Hindustan for a day laborer, also extended to those of some other eastern countries. Many of these have been introduced into the West Indies, Mauritius, and other places, their passage being paid for them on their agreeing to serve for a term of years. The first coolie emigrants appear to have been those sent to British Guiana from Calcutta in 1839 to supply the want of labor felt after the abolition of slavery. The coolies employed in



Guiana are still chiefly from India, but there is also a considerable number of Chinese. Coolies have also been introduced into Jamaica, Trinidad, Natal, and large numbers into Mauritius, the Indian population of the latter island being nearly 250,000. The Chinese coolies have been principally sent to Cuba and Peru. Chinese coolies were excluded from the United States by act of Congress in 1888. Through the exclusion of Japanese from the schools in San Francisco, a movement is now being made to have Japanese coolies also excluded.

**COOL-TANKARD**, an old English beverage of various composition, but usually made of ale, with a little wine or wine and water, with an addition of lemon juice, spices, etc.

**COOM'ASSIE**, a town, West Africa, capital of Ashantee, 130 miles north of Cape Coast Castle. It was taken and burned by Sir Garnet Wolseley in 1874. In 1900 it was invested by Ashanti natives, but was relieved after severe fighting. Pop. 50,000.

**COON OYSTER**, in the southern states an oyster which grows close enough to shore to be obtained by the raccoon.

**COOPER, Henry Ernest**, an American lawyer, born in Indiana in 1857. He settled in Honolulu and was one of the leaders of the American revolution in the Hawaiian Islands. He filled several offices of the provisional government pending the annexation of the islands to the United States.

**COOPER, James Fenimore**, American novelist, born at Burlington, New Jersey, in 1789, studied at Yale College, and entered the American navy as a midshipman at the age of sixteen. In



*J. Fenimore Cooper*

1821 appeared the novel of Preeaution, the first production of his pen. Though successful it gave no scope for his peculiar powers, and it was not till the production of *The Spy* and *The Pioneers* that he began to take a high place among contemporary novelists. After that came a steady flow of novels dealing with life on the sea and in the backwoods, most of which, like *The Pilot*, *Red Rover*, *Waterwitch*, *Pathfinder*, *Deer-slayer*, and *Last of the Mohi-*

cans, are familiar names to the novel-reading public. After visiting Europe and serving as consul for the United States at Lyons for three years, Cooper returned to America, where he died at Cooperstown, New York, 1851. Besides his novels he wrote a history of the U. S. navy, and some volumes descriptive of his travels.

**COOPER, Peter**, American inventor, manufacturer, and philanthropist, born 1791, died 1883. He started life with few advantages, being almost self educated; but by dint of energy, perseverance, sagacity and integrity, accumulated a large fortune. He carried on the manufacture of glue and isinglass for over fifty years, and was also connected with the iron-manufacture, the railways (he designed and built the first American locomotive), and the telegraphs of the U. States.

**CO-OPERATIVE SOCIETIES** are associations of individuals for mutual assistance in industrial or commercial objects. One form of co-operative societies is that of an association of men belonging to some trade or industry for the purpose of carrying it on entirely by their own efforts, and thus securing all the profits of their labors to themselves; but much more common associations are those the object of which is to provide the members, and sometimes also the general public, with the ordinary household necessities, at as near as possible the prime cost. Associations of the former kind are thus associations for production, those of the latter for distribution, by means of what are commonly known as Co-operative Stores.

**COOPER'S CREEK**, or the **BARCOO**, called by the latter name chiefly in its upper course, the largest inland river of Australia, which rises in Queensland by two branches, the Thomson and Victoria (or Barcoo), and flows southwest to Lake Eyre.

**COOPER UNION**, an institution for the advancement of art and science, founded in New York in 1859 by Peter Cooper. The purpose is to educate the people by means of day and night classes in the different technical trades and sciences. The institution has over \$5,000,000 in property and is in reality a technical school which is very well attended. It has about 2,000 students and confers degrees.

**COORG**, or **KURG**, an ancient principality now a province in Southern Hindustan, lying between Mysore on the east and northeast and the districts of South Canara and Malabar on the west; area, 1583 sq. miles. The country has a healthy climate, and yields coffee, spices, timber, etc. The capital is Merkara. Pop. 180,607.

**CO'OS**. See Cos.

**CO-PARTNERSHIP**. See Partnership.

**COPE**, a sacerdotal vestment, resembling a sleeveless cloak with a hood, reaching from the shoulders to the feet, worn on solemn occasions, and particularly in processions, by the pope and other bishops as well as by priests. It was one of the vestments retained at the reformation in the Anglican Church.

**COPE**, Edward Drinker, an American zoologist born in Philadelphia in 1840, died in 1897. For many years he was

professor in the University of Pennsylvania and from 1878 was the editor of the *American Naturalist*. Cope's principal contribution to science was his fine collections of fossils and the classification and interpretation of the same. His principal writings are *Origin of the Fittest*, *Origin of Genera*, and *Primary Factors of Organic Evolution*.



Cope.

A. Probably Dr. Robert Langton, Queen's Coll. Oxon. 1. Cope.

B. Figure of Pugin's Glossary. 222. Cope.

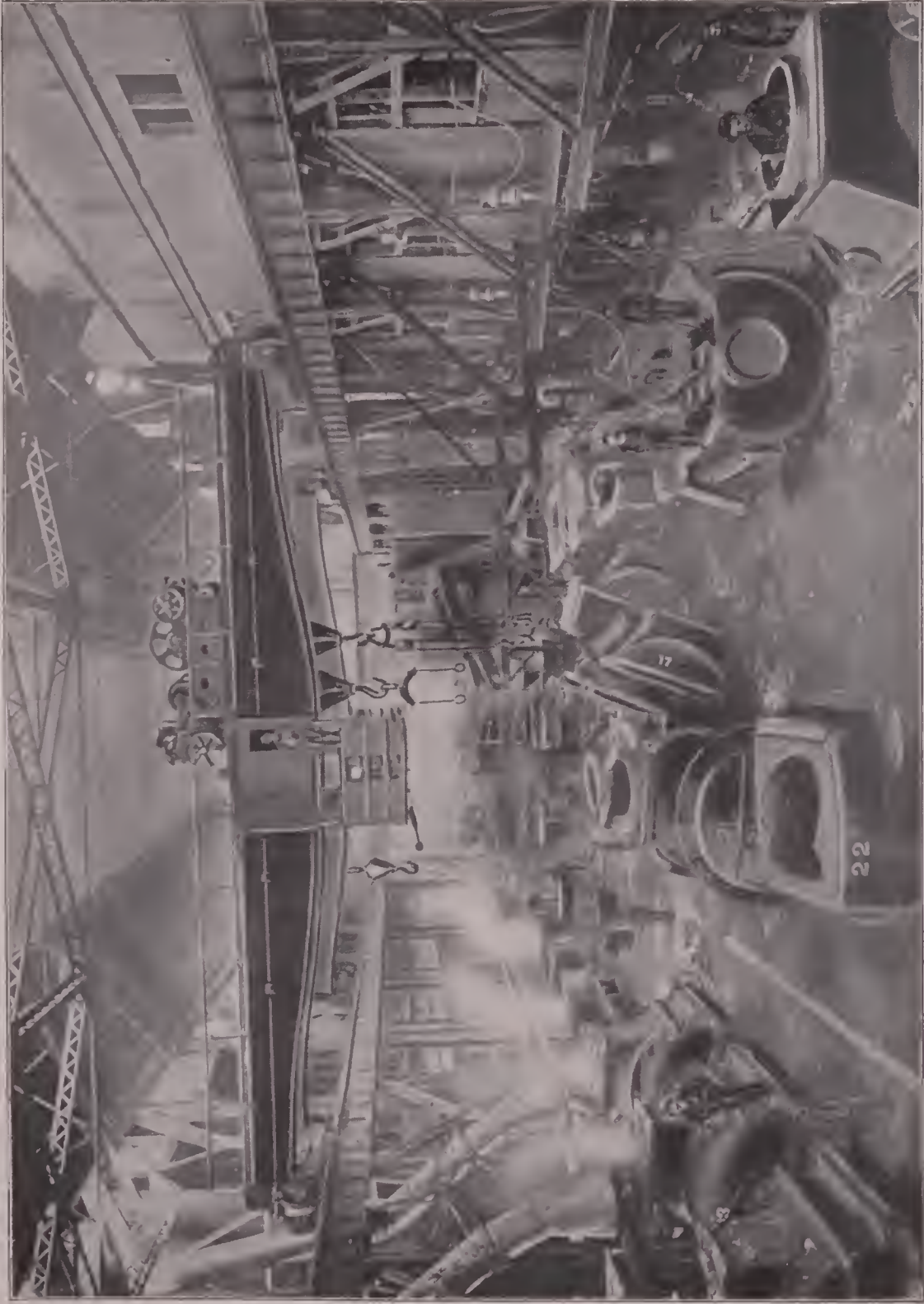
**CO'PECK**, a Russian copper coin, so called from the impression of St. George bearing a lance, the hundredth part of a silver ruble, or about the eightieth part of a paper ruble. It is equal to about three quarters of a cent.

**COPENHA'GEN**, the capital of Denmark, on the Sound, the larger and older portion of it on the east side of the Island of Zealand, a smaller portion on the north point of the island of Amager, with between them a branch of the sea forming the harbor. It has a citadel and several strong forts protecting it on the sea side; and is mostly well built, principally of brick. The chief buildings are the royal palace of Rosenborg, with many antiques and precious articles; the Amalienborg, consisting, properly speaking, of four palaces, one of them the usual residence of the sovereign; the palace of Charlottenburg, now the repository of the Academy of Arts; the Royal Library, containing 550,000 volumes and 25,000 manuscripts; Thorwaldsen's Museum, containing a great many of the sculptor's works; the university buildings; the Vor Frue Kirke; the arsenal; etc. The university, founded by Christian I. in 1478, has about 700 professors and teachers, five faculties, and a library of 200,000 volumes. The harbor is safe and commodious. Copenhagen is the principal station of the Danish fleet and the center of the commerce of Denmark. It carries on an active trade with Norway, Sweden, Russia, and Germany, and in particular with Britain, the principal exports being grain, butter, cheese, beef, pork, cattle, horses, hides, etc. It has foundries and machine-works, woolen and cotton mills, porcelain works, breweries, distilleries, etc., and produces also watches, clocks, pianofortes, etc. Sugar-refining and tanning are carried on. Pop. with suburbs, 476,806.









COPPER CONVERTER PLANT IN OPERATION.

The gigantic size of the machines in the metal manufacturing is shown strikingly in this illustration but the great casting tools themselves are but toys compared to the giant crane, which, responsive to the touch of the engineer, travels from end to end of the great shop, picking up weights of hundreds of tons with greater ease than a person would pick a needle from the floor.



**COPERNICUS**, Nicholas, astronomer, born at Thorn, then in Poland, Feb. 19, 1473, his family being supposed to have come originally from Westphalia. Having studied medicine at Cracow, he afterward devoted himself to mathematics and astronomy, and in 1500 taught mathematics at Rome with great success. Returning to his own country he was made a canon in the cathedral of Frauenburg, and began now to work out his new system of astronomy. Doubting that the motions of the heavenly bodies could be so confused and so complicated as the Ptolemaic system made them, he was induced to consider the simpler hypothesis that the sun was the center round which the earth and the other planets revolve. Besides this fundamental truth Copernicus anticipated, for he can scarcely be said to have proved, many other of the principal facts of astronomical science, such as the motion of the earth round its axis, the immense distance of the stars which made their apparent position the same from any part of the earth's orbit, etc. His general theory also enabled him to explain for the first time many of the important phenomena of nature, such as the variations of the seasons and the precession of the equinoxes. The great work in which Copernicus explained his theory, *De Orbium Cœlestium Revolutionibus* (On the Revolutions of the Celestial Orbs), was completed in 1510, and published at Nuremberg in 1543. It was long among books forbidden to Roman Catholics. He died at Frauenburg, 24th May, 1543.

**COPPER**, one of the most ancient known metals, deriving its name from Cyprus, large supplies having in Greek and Roman times come from that island. It is a metal of a pale red color tinged with yellow. Next to gold, silver, and platinum it is the most ductile and malleable of metals; it is more elastic than any metal except steel, and the most sonorous of all except aluminium. Its conducting power for heat and electricity is inferior only to that of silver. It has a distinct odor and a nauseous metallic taste. It is not altered by water, but tarnishes by exposure to the air, and becomes covered with a green carbonate. It occurs native in branched pieces, dendritic, in thin plates, and rarely in regular crystals, in the primitive and older secondary rocks. Blocks of native copper have sometimes been got weighing many tons. Its ores are numerous and abundant. Of these several contain sulphur and iron or other metal, such as copper glance or vitreous copper; gray copper or Fahlerz, one of the most abundant and important ores; and copper pyrites or yellow copper ore, and other abundant ore. The red oxide of copper forms crystals of a fine red color, and is used for coloring glass. There are two native carbonates, the blue and the green, the latter being the beautiful mineral malachite, the former also known as blue malachite. Blue Vitrol is a sulphate, and is used for dyeing and preparing pigments, as are various other copper compounds. Verdigris is an acetate. The arsenite of copper is the pigment Scheele's green.

Schweinfurth green is another copper pigment. All the compounds of copper are poisonous. It is found in most European countries, in Australia and Japan, in Africa and in North and South America (especially in the vicinity of Lake Superior). In Britain the mines of Cornwall are the richest.

**COPPERAS**, sulphate of iron or green vitriol, a salt of a peculiar astringent taste and of a fine green color. When exposed to the air it assumes a brownish hue. It is much used in dyeing black and in making ink, and in medicine as a tonic. The copperas of commerce is usually made by the decomposition of iron pyrites.

**COPPER-HEAD**, a venomous N. American serpent, of the rattlesnake family.

**COPPER-HEADS**, a name given to residents of the north during the civil war who either sympathized with the south, or opposed the prosecution of the war against the south.

**COPPER-PLATE**, a polished plate of copper on which the lines of some drawing or design are engraved or etched to be printed from; also a print or impression from such a plate.

**COPPER PYRITES**, or yellow copper ore, a double sulphide of copper and iron composed in equal parts of copper, sulphur, and iron. It occurs mostly in primary and metamorphic rocks, and is the chief copper ore of England.

**COPTS**, a name given to the Christian descendants of the Ancient Egyptian race, belonging mostly to the Jacobite or Monophysite sect. Reduced by a long course of oppression and misrule to a state of degradation, the number and national character of the Copts have greatly declined. At present they do not amount to more than perhaps 350,000. Their costume resembles that of the Moslems, but they are very generally in the habit of wearing a black turban for distinction's sake. In various other respects they resemble the Moslem, and they practice circumcision and abhor the flesh of swine. The women go out with veiled faces like the Moslem women. There are schools for the male children, but very few of the females are taught to read. Confession is required of all. Fasting holds a prominent place in the life of the Copt, who is, indeed, required to fast (that is, to abstain from all animal food except fish) during the greater part of every year. The head of the Coptic Church is the Patriarch of Alexandria, who is also head of the Abyssinian Church. He is regarded as the successor of St. Mark, by whom the Copts believe that Christianity was introduced among them. They are very strict and exclusive in their religion but a certain number have latterly been converted to Protestantism. The Copts are quiet and industrious, have a good capacity for business, but are said to be servile and crafty. The Coptic scribes form a close guild. What is called the Coptic language is no longer spoken, Arabic having taken its place. It is still used, however, in a formal way in their religious services. It is regarded as the direct descendant of the ancient sacred language of the Egyptians. There is a tolerably abundant Coptic

Christian literature, chiefly lives of saints, homilies, etc. It is written in what is substantially the Greek alphabet with some additional letters.

**COPYING MACHINES**, devices for making several copies of a writing, the chief of which are the so-called mimeograph and the papyrograph, the former an invention of Edison. Various other devices consist of sheets of jelly-like substance upon which the original, written in colored ink, is pressed leaving a reversed copy upon the surface of the jelly and from which other copies are made. No perfectly satisfactory copying machine has yet been devised.

**COPYRIGHT**, the exclusive property right to reproduce in writing, engraving, printing, or by any other means, of an artistic or literary thing for the purpose of sale. In the U. States a copyright is obtained by sending to the librarian of congress at Washington two copies of the thing with a fee of 50 cents (or \$1 if papers are desired), on or before the day of publication. Copyright was originated in the reign of Queen Anne of England and has been practiced in the U. States since the beginning of this government. The right extends only to the form of the thing copyrighted and not to its substance. The right is granted for a period of 28 years and this period may be extended for an additional period of 14 years. Interpretation of the law is somewhat plastic, and infringement is a matter that must be decided by a court. By the act of 1891 foreign works may be copyrighted in America if printed from plates made in this country and published simultaneously.

**COQUELIN** (ko'klan), Benoit Constant, a noted French actor, born at Boulogne-sur-Mer, Jan. 23, 1841. He visited the U. States in 1888, in 1893, and in 1894. His most celebrated character is that of Cyrano de Bergerac in Rostand's play. Died 1909.

**COQUELIN**, Ernest Alexandre Honore, brother of Constant Coquelin, a French actor, born in 1848. He is as well known for his success as a dramatic writer as for his histrionic talent.

**COQUIMBO** (ko-kim'bō), or Lasearena, a town of Chili, capital of the province of Coquimbo, stands near the sea, on a river of the same name. It is the see of a bishop. Pop. 13,000.—Porto Coquimbo, the port of the above, from which it is distant 7 miles to the s.w., has smelting works and a large export trade, chiefly in copper and the precious metals. Pop. 5100.—The province is rich in copper, silver, gold, and other metals, and is mountainous. Pop. 165,474.

**COR'ACLE**, a small boat or canoe of oval form and made of wicker-work covered with skins. It was used by the ancient Britons, and something similar is still in use among Welsh fishermen and on the Irish lakes.

**COR'ACOID BONE**, a bone in birds joining the sternum and shoulder-bone, and giving support to the wing. In mammals it is represented by the coracoid process of the scapula.

**COR'AL**, the name applied to the calcareous stony structures secreted by many of the sea-anemones, etc. Two



kinds of corals are distinguished by naturalists, those in which the calcareous skeleton is developed in the walls of the body, as in the reef-building corals, and those in which (as in the red coral of commerce) the skeleton is external or cuticular. Reproduction takes place by ova, but chiefly by budding, the new individual remaining in organic



Formation of coral reefs, according to Darwin.

union with the old. The coral masses grow not merely by the multiplication of individuals, but by the increase in height of each of the latter, which, as they grow, become divided transversely by partitions. The animal, distended with ova, collapses on their discharge, and thus becomes too small for the cup which it formerly occupied; it cuts off the waste space by a horizontal layer of coral, and the repetition of this process gradually adds to the height of the mass. It is in this way that the coral reefs and islands, occurring in such abundance in the Pacific, the Indian Ocean, and the Red Sea, are built up—works of such stupendous and astonishing bulk when compared with the tiny creatures that produce them.

**COR'BEL**, in architecture, a piece of stone, wood, or iron projecting from the vertical face of a wall, to support some superincumbent mass. Corbels are of a



Corbel.



Corbel-table.

great variety of forms, and are ornamented in many ways. They are sometimes used in rows to support a projecting course called a corbel-table.

**CORCORAN ART GALLERY**, a collection of paintings and sculptures in Washington, D. C., presented to that city by W. W. Corcoran, containing numerous famous pieces. It is housed in a white marble building given by Ernest Flagg.

**CORDAY D'ARMANS** (kor-dā-där-män), Marie Anne Charlotte, commonly called Charlotte Corday, was born in Normandy in 1768, of a family which counted the poet Corneille among its ancestors. Her lover, an officer in the garrison of Caen, was accused by Marat

as a conspirator against the republic, and assassinated by villains hired for that purpose. This, as well as a deep-rooted hatred against all oppressors, determined Charlotte Corday to free her country from Marat. Having obtained an interview with Marat at his own house she plunged her dagger into his bosom, and gave herself up to the attendants who rushed in at his cries. When tried for the murder before the revolutionary tribunals, her air was dignified and her replies firm. In spite of the fervid eloquence of her advocate's defense she was condemned to the guillotine, and was executed on 17th July, 1793.

**CORDELIERS** (kor'de-lêrz), originally an order of Franciscan monks who wore as part of their dress a girdle of knotted cords; afterward the name given to a society of Jacobins, to which the names of Marat, Danton and Camille Desmoulins gave some reputation. The club lasted from 1792 to 1794, and took its name from their place of meeting.

**CORDITE**, a new smokeless explosive for use in ordnance, so named from being made in cordlike forms.

**COR'DON**, in a military sense, troops so disposed as to keep up an uninterrupted line of communication, to preserve an area either from hostile invasion or from contagious diseases. In the latter sense it is called cordon sanitaire.

**COR'DOVA**, an ancient Spanish city on the Guadalquivir, in Andalusia, capital of a province of the same name. A part of the town is of Roman, a part



Cordova.

of Moorish origin. Pop. 55,614.—The province includes the fertile and beautiful valley of the Guadalquivir and the mountains of Sierra Morena. Area, 5188 sq. miles; pop. 420,728.

**COR'DOVA**, a town of the Argentine Republic, capital of province of same name. It occupies a beautiful site on the Primero, and has various important buildings and institutions, including a university. Pop. 58,275.—The province has an area of 54,000 sq. miles, a pop. of 456,000.

**CORDUROY'**, a thick cotton stuff corded or ribbed on the surface.—Corduroy road, in N. America, a road constructed with logs laid together over swamps or marshy places for carriages to pass over.

**CORD-WOOD**, wood cut and piled for sale by the cord, in distinction from long wood; properly, wood cut to the length of 4 feet; but in this respect the practice is not uniform.

**CORE'A**, a kingdom of Asia, consisting chiefly of a peninsula lying north east of China, bounded n. by Manchuria, e. by the Sea of Japan, s. by a narrow



sea which parts it from the Japanese Islands, and w. by the Yellow Sea. Pop. vaguely estimated at about 9,000,000 or more; area about 80,000 sq. miles. Söul or Seoul, is the capital. The peninsula is traversed through its length by a mountain range, abrupt and precipitous on the east, but forming a gentle slope on the west side, which, being watered by the principal rivers of the country is exceedingly fertile. In the north the only grain that can be grown is barley; but in the south, wheat, cotton, rice, millet, and hemp are grown

extensively. The ginseng root is a production greatly valued in China and Japan. Tigers, panthers, foxes, wolves, and sables are abundant. The peninsula abounds in minerals, gold, silver, iron, copper, lead, and coal. Korea is governed by a king, whose sway is nominally absolute. Till recently China was suzerain of Korea, but the war with Japan ended this. Buddhism, Confucianism, and Taoism are the chief religions.

**CORELLI**, Marie. An English novelist, the adopted daughter of Charles Mackay, the poet. She was born in Italy in 1864, and educated in London and in a convent in France. A musical career was planned for her, but she early adopted literature instead. Among her



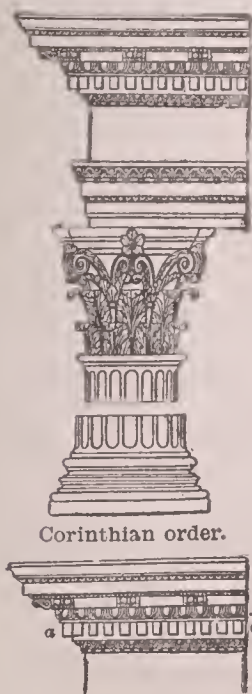
writings are: The Romance of Two Worlds; Thelma; The Sorrows of Satan; The Mighty Atom; The Murder of Delicia; Ziska; Jane; The Master-Christian; Boy; and Temporal Power.

**COREOPSIS**, An herbaceous annual or perennial plant of the order Compositæ, nearly all natives of eastern N. America, and popularly known as tick-seed, the fruit being in the shape of a small tick. It is often raised for its showy yellow or rose-purple flowers with yellow or brown discs. The perennials are grown in hardy borders; the annuals in the garden in almost any soil.

**CORFU**, a Greek island in the Mediterranean, the most northerly of the Ionian Islands, at the mouth of the Adriatic, near the coast of Albania, about 40 miles long, and from 15 to 20 wide; square miles, 427. The surface rises at one point to the height of 3000 feet, the scenery is beautiful, the climate pleasant and healthy, the soil fertile. Oranges, citron, grapes, honey, wax, oil, and salt are abundant.

**CORINTH**, a once celebrated city upon the isthmus of the same name, which unites Peloponnesus with Northern Greece. It was renowned among the cities of Greece, commanded by its advantageous position a most important transit trade, and possessed all the splendor which wealth and luxury could create. St. Paul lived here a year and a half, and two of his epistles are addressed to the Corinthians.—New Corinth is a village on the shore of the gulf, several miles n. w. from the site of ancient Corinth; it is the seat of an archbishop. Pop. 3000.

**CORINTHIAN ORDER**, that order of Grecian architecture of which the most characteristic feature is the capital of the column, which is adorned with



aa, Details of the Corinthian cornice.

beautifully carved acanthus leaves, but varies considerably in minor details. The column is generally fluted, with a fillet between the flutings, and stands upon a base. The entablature is va-

riously decorated, especially the cornice; the frieze may be quite plain, or sculptured with foliage and animals. The Corinthian order was not very common in Greece before the time of Alexander the Great; among the Romans it was much employed.

**CORINTHIANS**, Epistles to the, two epistles addressed to the church at Corinth about A.D. 57 or 58, which have been admitted as genuine writings of St. Paul by even the most critical assailants of the New Testament canon.

**CORIOLANUS**, the name given to an ancient Roman, Caius, or more properly Cneius, Marcius, because the city of Corioli the capital of the kingdom of the Volsci, was taken almost solely by his exertions. He was banished for seeking to deprive the plebeians of their hard-earned privileges, and in particular of the tribuneship; and seeking revenge, he took refuge among the Volsci, the bitterest enemies of Rome, and prevailed upon them to go to war with her. The story of Coriolanus, which is now regarded as legendary, forms the subject of one of Shakespeare's plays.

**CORK**, a city in the south of Ireland, capital of the county of Cork, situated on the river Lee. It is 15 miles from the sea, and besides an upper harbor at the city itself, and quays extending over four miles in length, there is a lower harbor at Queenstown, 11 miles below the town. The entrance, deep and narrow, is strongly fortified on each side. Cork is the third city in Ireland, and exports great quantities of grain, butter, bacon, hams, eggs, and live stock. The principal industries are tanning, distilling, brewing, and the making of tweeds and friezes. Pop. 100,022.—The county is the most southerly and the largest in Ireland, having an area of 2885 sq. miles, or 1,849,686 acres, of which less than a fourth is under crops. The county town is Cork; other towns are Queenstown, Fermoy, Youghal, Bandon, Mallow, and Kinsale. Pop. 404,813.

**CORK** is the external bark of a species of oak which grows in Spain, Portugal, and other southern parts of Europe and in the north of Africa, and is distinguished by the great thickness and sponginess of its bark, and by the leaves being evergreen, oblong, somewhat oval, downy underneath, and waved. The outer bark falls off of itself if left alone, but for commercial purposes it is stripped off when judged sufficiently matured, this being when the tree has reached the age of from fifteen to thirty years. The first stripping yields the coarsest kind of bark. In the course of eight or nine years, or even less, the same tree will yield another supply of cork of better quality, and the removal of this outer bark is said to be beneficial, the trees thus stripped reaching the age of 150 years or more. Cork is light, elastic, impervious to water, and by pressure can be greatly reduced in bulk, returning again to its original size. These qualities render it peculiarly serviceable for the stopping of vessels of different kinds, for floats, buoys, swimming-belts or jackets, artificial limbs, etc. Corks for bottles are cut either by hand or by means of a

machine. The best corks are cut across the grain.

**CORMORANT** (a sea-crow), the name of several large web-footed birds of the pelican family, or forming a family by themselves. They have a longish and strongly-hooked bill, long neck, short wings, and rather long rounded tail;



Common cormorant.

all the toes are united by a web, and, though excellent swimmers, they are able to perch on trees; color generally black or dark. The common cormorant of Europe is larger than a goose, but with smaller wings. It occupies cliffs by the sea, feeds on fish, and is extremely voracious. It dives and swims with great power, and pursues its prey beneath the surface of the water, often to a great depth. Among the Chinese cormorants have long been trained to fish for man. At first a ring is placed on the lower part of the bird's neck to prevent it swallowing the prey, and in time it learns to deliver the fish to its master without such a precaution being necessary.

**CORMUS**. See Corm.

**CORN**, a hardened portion of the cuticle of the foot, appearing as a sort of distinct growth, produced by pressure. Corns are generally found on the outside of the toes, but sometimes between them, on the sides of the foot, or even on the ball. They appear at first, as small dark points in the hardened skin, and in this state stimulants or escharotics, as nitrate of silver (lunar caustic), are recommended. Perhaps the most efficacious remedy for corns is the application of glacial acetic acid night and morning.

**CORN** is the generic term for all kinds of grain used for making bread, and is applied specifically to the principal breadstuff: in England to wheat, in the U. States generally to maize, and frequently in Scotland to oats.

**CORN**, Indian. See Maize.

**CORNEILLE** (kor-nā-yè), Pierre, the father of French tragedy and classic comedy was born at Rouen in 1606, at which place his father was advocate-general. He began his dramatic career with comedy, and a series of vigorous dramas, *Mélite* (1629), *Clitandre*, *La Veuve*, *La Suivante*, etc., announced the advent of a dramatist of a high order. In 1635 he entered the field of tragedy with *Medea*; but it was not till the appearance of his next work, the famous *Cid*, that Corneille's claim was recognized to a place amongst the great tragic poets. The *Cid* was an imitation of a Spanish drama,



and though gravely defective in the improbabilities of the plot and other respects, achieved an immense success for a certain sublimity of sentiment and loftiness of ideal, which are the native characteristics of Corneille's poetry. After the Cid appeared in rapid succession Horace (1639); Cinna (1639), his masterpiece, according to Voltaire; and Polyeucte (1640), works which show Corneille's genius at its best. He died in 1684.

**CORNE'LIA**, daughter of Scipio Africanus the elder, married Tiberius Sempronius Gracchus, censor B.C. 169, by whom she was the mother of the two tribunes, Tiberius and Caius Gracchus.

**CORNE'LIAN**, or Carnelian, a gem of a light-red or flesh color. It consists of silica along with minute quantities of the oxides of iron, aluminium, and sometimes of other metals, and is used for seals, bracelets, necklaces, and other articles.

**CORNE'LIUS NEPOS**, a Roman author of the 1st century B.C., the contemporary of Cicero and Catullus. The only extant work attributed to him is a collection of short biographies, probably an abridgment of a work written by Nepos. These biographies have long been a favorite school-book, and popular editions of them are very numerous.

**CORNE'LIUS**, Peter von, German painter, born at Düsseldorf in 1787, died in 1867. He early exhibited a taste for art, and studied the great masters, especially Raphael. In 1811 he went to Rome, where, in conjunction with Overbeck, Veit, and other associates, he may be said to have founded a new school of German art, and revived fresco-painting in imitation of Michael Angelo and Raphael. He left Rome in 1819 for Düsseldorf, where he had been appointed director of the academy, but he soon settled in Munich to give his whole attention to the painting of the Glyptothek and the Ludwigskirche there. In these two great works he was assisted by his Munich pupils. In 1833 he made another visit to Rome, and in 1839 he visited Paris. In 1841 he was invited to Berlin by Frederick William IV., who intrusted him with the painting of the royal mausoleum or Campo Santo. The most celebrated cartoon in this series is the Four Riders of the Apocalypse. The series consists of twelve paintings, which have been engraved. Cornelius, a true representative of modern German thought, introduced into art a metaphysical and subjective element which is easily liable to be abused; and in his work grandeur of conception and elevation of tone have to make up for the want of the finest natural effects.

**CORNELL'**, Alonzo B., American politician, son of Ezra Cornell, was born at Ithaca, N. Y., in 1832. He was the Republican candidate for Lieutenant-Governor of New York in 1863, and from 1869 to 1873 was surveyor of customs in New York. He was chairman of the Republican State Committee from 1870 to 1878, and was three times Speaker of the New York Assembly. From 1880 to 1883 he was Governor of New York.

**CORNELL**, Ezra, American capitalist and philanthropist, founder of Cornell University was born in 1807 in Westchester County, N. Y. His attention being turned accidentally in 1842 to the project of constructing a telegraph line from Baltimore to Washington, he invented a machine for laying the wires under ground and was subsequently put in charge of the work. The insulation being poor, however, the plan had to be abandoned, and on Cornell's suggestion the wires were strung on poles, and the line was thus speedily completed. Subsequently Cornell devoted his attention almost wholly to the construction of telegraph lines and the organization of telegraph companies, and was instrumental in forming the Western Union Telegraph Company in 1855. He was a member of the first Republican National Convention in 1856, was president of the New York State Agricultural Society in 1862, and was a member of the State Assembly in 1862-63, and of the State Senate in 1864-67. In 1868 "The Cornell University," so founded, was formally opened. Mr. Cornell also built a public library at Ithaca. He died in 1874.

**CORNELL UNIVERSITY**, founded by Ezra Cornell at Ithaca, N. Y., in 1865. Cornell University comprises the following departments and colleges; The Graduate Department, having charge of all graduate studies pursued at the university under the several faculties. This department offers courses leading to the degrees of A.M., Ph.D., etc. Twenty-four fellowships, ranging from \$500 to \$600 a year, and 17 scholarships, of the annual value of \$300 a year, are available for students. The Academic Department offers elective courses leading, whether sciences, letters, or the classics are mainly chosen, to the degree of A.B. The College of Law offers courses leading to the LL.B. degree. The Medical College, partially conducted at New York City, confers the degree of M.D. The College of Agriculture offers courses leading to the B.S.A. degree. Connected with this college is an agricultural experiment station, established by the Federal Government in 1887. The New York State Veterinary College confers the degree of D.V.M. The State College of Forestry confers the degree of F.E. The College of Architecture confers the degree of B.Arch. The College of Civil Engineering confers the degree of C.E. Sibley College of Mechanical Engineering and Mechanic Arts, consisting of the departments of mechanical, electrical, experimental engineering, the department of mechanic arts, etc., confers the degree of M.E.

The libraries, including the famous Andrew D. White collection on the French Revolution and the Fisk Dante collection, contain 261,852 volumes, besides 43,000 pamphlets. The income of the university from all sources is about \$800,000 a year. The presidents since its inception have been: Andrew D. White, LL.D. (1865-85); Charles Kendall Adams, LL.D. (1885-92); Jacob Gould Schurman, LL.D (1892-).

**CORNER**, a trade term applied to the act of acquiring control of all or nearly all of a commodity, or of the

stock-shares of a company (when they are to be bought in the market), the purpose being to force those who are bound to deliver the goods into buying the goods (or shares) from those who control them, at the latter's prices. When those who are engineering the corner are forced through lack of means, to throw their holdings on the market the corner is said to be smashed. Few corners have been successful.

**CORNET**, a wind-instrument of former times, originally curvilinear or serpentine in form and increasing in diameter from the mouthpiece to the lower end.



Cornet-a-pistons.

The modern cornet is a keyed bugle which has a very agreeable tone, and is much used in orchestras and military bands.

**CORN-HUSKING**, Corn-shucking, an assemblage of friends and neighbors at the house of a farmer to assist him in stripping the husks or shucks from his Indian corn.

**CORN'ING**, a city and one of the county seats of Steuben county, N. Y., 18 miles w.n.w. of Elmira; on the Chemung river, and on the New York Central, the Erie, and the Lackawanna railroads. Pop. 12,061.

**CORN-LAWS**, a name commonly given to certain statutes passed to protect the agricultural interest in Britain.

**CORN'WALL**, a maritime county of England, forming the southwestern extremity of the island, bounded e. by Devonshire, and surrounded on all other sides by the sea; area, 1350 sq. miles or 863,665 acres. The chief wealth of the county is in its minerals, especially its mines of copper and tin, though the value of both has diminished. Several mines exceed 350 fathoms in depth. In the Botallack Copper Mine, a few miles north of Land's End, the workings are carried below the sea. Cornwall, with the Scilly Isles, seems to have been the Cassiterides or Tin Islands of antiquity. The natives long maintained their independence against the Saxons, and their country was spoken of as West Wales. Their language also long continued to be Celtic. It gives the title Duke of Cornwall to the eldest son of the sovereign of Great Britain,



and forms a royal duchy, the revenues of which belong to the Prince of Wales for the time being. The dukedom was created for the Black Prince in 1337. Pop. 322,957.

**CORN'WALLIS**, Charles, Marquis of, son of the first Earl Cornwallis, born in 1738. On the outbreak of the American war he sailed with his regiment, served with distinction under Howe and Clinton, and in 1780 was left in independent command in South Carolina with 1000 men. He defeated Gen. Gates at Camden 1780, and General Green at Guilford in 1781, but six months afterward was besieged in Yorktown and compelled to surrender 19th Oct. 1781. This disaster proved decisive of the war. In 1786 Lord Cornwallis went out to India with the double appointment of commander-in-chief and governor-general, invaded



Lord Cornwallis.

Mysore in 1791, and obliged Tippoo Saib to surrender much territory. Having returned to Britain he was created a marquis (1792), appointed Lord-lieutenant of Ireland, and again in 1804 governor-general of India. He died the following year.

**COROL'LA**, in botany, the portion of the flower inside the calyx; the inner floral envelope. The corolla surrounds the parts of fructification and is composed of leaves called petals. When there are several free leaves it is called a polypetalous corolla, as in the rose; but when the petals are united by the margins into a continuous structure it is called monopetalous, or more correctly gamopetalous. It may generally be distinguished from the calyx by the fineness of its texture and the gayness of its colors; but there are many exceptions.

**CORONA**, the beautiful, brilliant streamers which are seen radiating from the opaque disc of the sun during a total eclipse. The nature of the corona is wholly unknown, although it is believed to be of electric or magnetic origin. As no two coronæ are alike the presumption is that the corona itself is a perpetually changing radiation. The streamers are hundreds of thousands of miles in length.

**CORONA'TION**, the placing of the crown on a monarch's head with solemn rites and ceremonies. Part of the

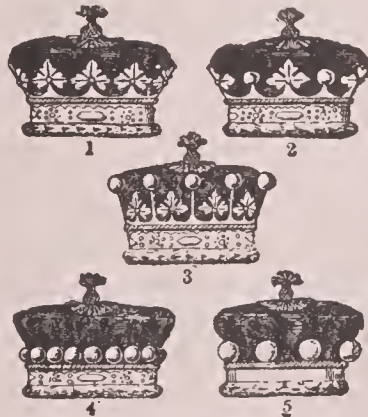
ceremony usually consists in the oath which the monarch takes that he will govern justly, will always consult the real welfare of his people, and will conscientiously observe the fundamental laws of the state.



Corona.

**COR'ONER**, an official whose chief duty is to inquire into the cause of the death of persons killed or dying suddenly. His examination is made in all cases with the aid of a jury, in sight of the body, and at the place where the death happened. If the body is not found he cannot sit. If the jury have brought in a verdict of murder or manslaughter the coroner may commit the accused party to prison or admit him to bail.

**COR'ONET**, such a variety of crown as is worn by princes and noblemen. The coronet of a British duke is adorned with strawberry leaves; that of a marquis has



1, Coronet of a duke. 2, Do. of a marquis. 3, Do. of an earl. 4, Do. of a viscount. 4, Do. of a baron.

leaves with pearls interposed; that of an earl raises the pearls above the leaves; that of a viscount is surrounded with pearls only; that of a baron has only six pearls.

**COROT** (kō-rō), Jean-Baptiste-Camille, French artist, born at Paris in 1796. He exhibited for the first time in the Salon in 1827, but some years elapsed before the high qualities of his work were recognized. The fortune which he inherited from his father enabled him, however, to follow out the bent of his genius, and the last twenty-five years of his life were a continuous triumph. He died in 1875. He fre-

quently painted figure subjects, including the large sacred pictures, the Flight into Egypt and the Baptism of Christ; but his most characteristic and successful work was in landscape. His woodland scenes, painted for the most part at dawn or twilight in a scheme of pale greens and silvery grays, show a singularly subtle feeling for this phase of nature, and are undoubtedly among the most important contributions of the century to landscape art.

**COR'PORAL**, a petty officer ranking just above the ordinary private and below the sergeant. He has charge of one of the squads of the company, places and relieves sentinels, etc.

**CORPORA'TION**, in English common law (the first modern definition of a corporation) a body with certain legal rights and powers. A corporation has essentially three factors—persons who are its members, persons who are its trustees, and a legal charter for its existence. A corporation consisting of only one person (as the sovereign of England, or the Roman Catholic archbishop of New York or Chicago) is called a sole corporation; and a corporation consisting of several persons is called an aggregate or sole corporation. Corporations may be ecclesiastical, civil, eleemosynary, and so on. Strictly speaking joint stock companies, such as railroads, modern "trusts," etc., are not corporations although generally so termed in the United States.

**CORPS** (kōr), a word often used as a military and a political term.—A corps d'armée, or army corps, one of the largest divisions of an army.—Corps diplomatique, the body of ministers or diplomatic characters.—Corps législatif (kōr lā-zhis-lā-tēf), the lower house of the French legislature in 1857-70.

**COR'PULENCE**, the unwieldy state of the human body due to the excessive deposition of fat. It is promoted by a diet too rich in fat-forming materials, fats, starch and sugars, bodily inactivity, tranquillity of mind, etc. There is, however, a diseased state of the system, which, independently of all these influences, will increase the production and deposition of fat. If corpulence is excessive it becomes troublesome and at length dangerous. In curing corpulence due attention must be paid to the regulating of the diet, exercise, and sleep of the individual. Especial attention must be given to the kind of diet. Avoid all kinds of fat-forming food, such as fat, cream, butter, sugar, potatoes, farinaceous food and malt liquors, and indeed alcoholic liquors of all kinds. Little bread should be eaten: a moderate increase in animal foods, lean beef, fish, fowl, eggs, is allowed: green vegetables and fresh fruit may be partaken of. Regular exercise to suit the person's powers should be engaged in. A noted instance of corpulence is Daniel Lambert, who weighed over 50 stone, or more than 700 lbs. Moderate corpulence may be quite consistent with health.

**CORPUS CHRISTI**, the consecrated host at the Lord's supper, which, according to the doctrines of the R. Catholic Church, is changed by the act of consecration into the real body of Christ.



This doctrine caused the adoration of the consecrated host, and hence the R. Catholic Church has ordained for the host a particular festival, called the Corpus Christi feast. This was instituted in 1264 by Pope Urban IV. by a bull, in which he appointed the Thursday of the week after Pentecost for the celebration of the Corpus Christi festival throughout Christendom. Since then this festival has been kept as one of the greatest of the Catholic Church. Splendid processions, in which the host is carried by a priest in a precious box, form an essential part of it. In France it is known as the fête-dieu.

**CORPUSCULAR THEORY OF LIGHT**, the older theory, which explained the phenomena of light by supposing that a luminous body emits excessively minute particles of matter, corpuscles as they were called which striking the eye produce the sensation of light. Newton held the corpuscular theory, and supported it with great ingenuity. This theory has long been displaced by the undulatory theory (which see).

**CORRAL'**, in South America and elsewhere, a yard or stockade for cattle.

**CORREGGIO** (kor-rej'ō), Antonio Allegri, Italian painter, born at Correggio, near Modena, in 1494. Among his best pictures are Night, in which the chief light is the glory beaming from the Infant Savior; the St. Jerome; the Marriage of St. Catherine; several Madonnas, one of them (called La Zingarella, or the Gipsy Girl) said to represent his wife; the Penitent Magdalene; the altar-pieces of St. Francis, St. George, and St. Sebastian; Christ in the Garden of Olives; the fresco of the Ascension in the Church of St. John, Parma; the Assumption of the Virgin in the cathedral of the same city; the Ecce Homo, and Cupid, Mercury, and Venus, both in the National Gallery, London. He died in 1534.

**CORREZE** (kor-rāz), an inland department, France; area, 2265 sq. miles; capital, Tulle. It belongs almost entirely to the basin of the Garonne. Except in a few valleys the soil is far from fertile, heaths occupying a great extent of surface, and agriculture being in a very backward state. Pop. 326,494.

**CORRIENTES**, a town, Argentine Republic, capital of the province of same name, on the Parana, near its confluence with the Paraguay, 390 miles n. Buenos Ayres. Pop. 15,500. Pop. of prov. 290,000.

**CORRIGAN**, Michael Augustine, an American Roman Catholic archbishop, born in New Jersey in 1839, died in 1902. From 1868 to 1873 he was president of Seton Hall College; in 1873 he was made bishop of Newark; in 1880 coadjutor to Cardinal McCloskey, archbishop of New York, and in 1885 archbishop of New York, which he remained until his death. Archbishop Corrigan was regarded as one of the ablest scholars of the American hierarchy.

**CORRO'SIVES**, in surgery, substances which eat away whatever part of the body they are applied to; such are glacial acetic acid, burned alum, white

precipitate of mercury, red precipitate of mercury, butter of antimony, etc.

**CORROSIVE SUBLIMATE**, the bichloride of mercury, a white crystalline solid, and an acrid poison of great virulence. The stomach-pump and emetics are the surest preventives of its deleterious effects when accidentally swallowed; white of egg is also serviceable, in counteracting its poisonous influence on the stomach. It is a powerful antiseptic.

**CORRUGATED IRON**, sheet-iron strengthened by being bent into parallel furrows. It is largely used for roofing, and when dipped in melted zinc, to give it a thin coating, is commonly known as galvanized iron.

**CORRUPT PRACTICES**, fraudulent methods used in public elections. The term is especially used in England and special laws have been enacted by parliament bearing on the matter. Most corrupt practices are provided for by common law, but statutes have been made in most of the United States providing for the punishment of fraud of every kind in elections.

**COR'SAIRS**, the Anglicized form of the term used in the south of Europe to denote those pirates who sailed from Algiers, Tunis, Tripoli, and the ports of Morocco.

**CORSELET** (kors'let): (1st) a cuirass or armor to protect the body from injury, worn formerly by pikemen, generally of leather, and pistol proof. (2d) The part of a winged insect which answers to the breast of other animals.

**CORSET**, a piece of underclothing worn to give shape to the body, consisting of a sort of closely-fitting jacket, usually stiffened by strips of steel, whalebone, or other means, and tightened by a lace. The materials of which it is made should be smooth and elastic, and it should be specially fitted for the individual wearer, as no two human figures are precisely alike. It should be remembered, also, that corsets are meant to preserve a good figure, not to make one, and any forcible compression of the shape, especially on young persons, will only end in destroying natural grace of movement and in serious injury to the health.

**COR'SICA**, an island in the Mediterranean, forming the French department of same name. It is separated from the island of Sardinia, on the south, by the Strait of Bonifacio, about 10 miles wide; length, n. to s., 110 miles; breadth, near its center, 53 miles; area, 3377 sq. miles. The most distinguished men to whom Corsica has given birth are Paoli and Napoleon. Pop. 288,596.

**COR'SO**, an Italian term given to a leading street or fashionable carriage-drive.

**CORT**, Henry, the inventor of the processes of puddling and rolling iron, born at Lancaster in 1740. He died in 1800.

**CORTES** (kor'tes), the old assembly of the estates in Spain and Portugal. In early times the king was very dependent upon them, especially in the kingdom of Aragon. When the kingdoms of Aragon and Castile were united under Ferdinand and Isabella the crown succeeded in rendering itself more inde-

pendent of the estates, and in 1538 Charles abolished the assembly of the estates in Castile altogether. Gradually the popular liberties were encroached upon, and the cortes at length were convened only for the purpose of homage or ceremony, or when a question regarding the succession arose. In 1808 Napoleon revived the cortes for his own ends. The present cortes of Spain are composed of a senate and congress equal in authority, and having the power along with the king to make laws. (See Spain.) The Portuguese cortes is coeval with the monarchy, and has had a history very similar to that of the Spanish.

**COR'TEZ**, or **CORTES**, Fernando, or Hernan, the conqueror of Mexico, was born in 1485 at Medellin, in Estremadura; died near Seville 1547. He went to the West Indies in 1504, where Velas-



Fernando Cortez.

quez, governor of Cuba, under whom he had greatly distinguished himself, gave him the command of a fleet, which was sent on a voyage of discovery. Cortez quitted Santiago de Cuba in 1518, with eleven vessels, about 700 Spaniards, eighteen horses, and ten small field-pieces. He landed on the shore of the Gulf of Mexico, where he caused his vessels to be burned, in order that his soldiers might have no other resource than their own valor. Having induced the Totonacs and Tlaxcalans to become his allies he marched toward Mexico, where he was amicably received; but, having seized their monarch Montezuma, and treated the people with great cruelty, they finally resisted. After a desperate struggle, in which 100,000 Mexicans are said to have perished, the city was taken, and soon after the whole country was subjugated. In 1528 he returned to Spain; but two years after he was again sent out to Mexico, where he remained for ten years, discovering meanwhile the peninsula of California. He returned once more to Spain, where, notwithstanding his great services, he was coldly received and neglected. After taking part in an expedition to Algiers in 1541 he passed the remainder of his days in solitude.

**CORUN'DUM**, the earth alumina as found native in a crystalline state. In hardness it is next to the diamond. The amethyst, ruby, sapphire, and topaz are considered as varieties of this mineral, which is found in India and China, and is most usually in the form of a six-sided prism or six-sided pyramid. It is nearly pure anhydrous alumina, and its specific gravity is nearly four times that of water. Its color is various—green, blue, or red, inclining to gray, due to









1. Egyptian woman in the Kalasiris. 2. Egyptian with apron and Sphinxhood. 3. Greek with chlamys. 4. Greek woman in double cloak. 5. Greek woman in long skirt and wide upper garment. 6. Roman with toga (time of emperors). 7. Roman licitor with sagum. 8. Roman woman in tunic, palla. 9. Roman peasant with sleeveless coat.



1. Man with coat and mantle; 11th century. 2. Warrior in Full Armor with spear. 3. Woman with schapel, gown and surcoat; 11th century. 4. Man with hood, schecke and dupfing; 14th century. 5. Woman with Krueseler, gown and mantle; 14th century. 6. Man in scalloped surtout with sash turban and tappert; 15th century. 7. Woman in scalloped robe and turban; 15th century. 8, 9. Man and woman in costume with tinkling bells; 15th century.









1. Man in doublet with deep waistcoat and short mantle. 2. Woman with hood, gown (embroidered bodice) and apron. 3. Man in slit costume with mantle, hat and sandals. 4. Woman with cape and turban. 5. Woman with farthingale and mill-stone (Elizabethan) ruff. 6. Man with cuirass, short mantle and mill-stone (Elizabethan) ruff. 7. Man in doublet, puffed breeches and short mantle. 8. Woman with overgarment, hat and calotte.



1. Costumes in the times of the Thirty Years' War, with waistcoat, lace collar, jackboots and spur-straps. 2. Woman with skirt bodice with sleeves, hat with feathers and ruff. 3. Man in short-sleeved jacket, skirt, trousers and mantle. 4. Woman in short-sleeved robe and undergarment. 5, 6. Costumes in the days of Louis XV. 7, 8. Costumes toward the end of the 18th century and at the time of the French Revolution.



traces of iron, copper, etc. Emery is a variety of corundum.

**CORUN'A**, a seaport of Spain, in the province of the same name in Galicia, on the northwest coast, on a peninsula at the entrance of the Bay of Betanzos.



Pop. 37,251.—The province is hilly, and its inhabitants chiefly engaged in agriculture and fishing. Area, 3079 sq miles; pop. 616,043.

**CORVETTE**, a vessel of war, ship-rigged, having a flush deck, with no quarter-deck and only one tier of guns; but the term is now somewhat loosely used. In the British navy there is a class of corvettes built of iron or steel, swift vessels, propelled by steam as well as by a large spread of canvas, and carrying heavy guns.

**CORVIDÆ**, the crows, a family of birds, in which the bill is strong, of conical shape, more or less compressed, and the gape straight. The nostrils are covered with stiff bristle-like feathers directed forward. The family includes the common crow, rook, raven, magpie, jay, jackdaw, nut-cracker, cornish chough, etc.

**CORYBANTES**, frantic priests of Cybele, who celebrated the mysteries with orgiastic dances to the sound of drum and cymbal.

**COR'YMB**, in botany, that form of inflorescence in which the flowers, each on its own pedicel of different lengths, are so arranged along a common axis as to form a flat broad mass of flowers with a convex or level top, as in the hawthorn and candytuft.

**CORYPHÆ'NA**, a genus of fishes of the mackerel family. The body is elongated, compressed, covered with small scales, and the dorsal fin extends the whole length of the back, or nearly so. All the species, natives of the seas of warm climates, are very rapid in their motions, and very voracious. They are of brilliant colors, and are objects of admiration to every voyager.

**CORYPHÆUS**, the leader of the chorus in the Greek dramas. His functions were often as wide as those of our stage-manager, conductor, and ballet-master. The name coryphée is now applied to a ballet-dancer.

**COSMETICS**, external preparations for rendering the skin soft, pure, and white, or for beautifying and improving the complexion. To these may be added preparations for preserving or beautifying the teeth, and those which are applied to the hair.

**COSMIC DUST**, the fine 'dust which falls upon the earth from regions beyond the earth. This may be observed often after a heavy rain in favorable places. The origin of this extra-

terrestrial material is believed to be  
meteoric

**COSMOG'ONY**, a theory of the origin or formation of the universe. Such theories may be comprehended under three classes:—1. The first represents the world as eternal, in form as well as substance. 2. The matter of the world is eternal, but not its form. 3. The matter and form of the universe is ascribed to the direct agency of a spiritual cause; the world had a beginning, and shall have an end.

**COSMOS**, order or harmony, and hence the universe as an orderly and beautiful system. In this sense it has been adopted by Humboldt as the title of his celebrated work, which describes the nature of the heavens as well as the physical phenomena of the earth.

**COSSACK POSTS**, in the U. States army a system of outposts consisting of four men and a non-commissioned officer. They are used instead of the old style line of pickets and are claimed, by American army officers to be far more efficient and self-reliant, owing to the support which the members of the outpost lend to one another.

**COS'SACKS**, tribes who inhabit the southern and eastern parts of Russia, paying no taxes, but performing instead the duty of soldiers. They supply the empire with one of the most valuable elements in its national army, forming a first-rate irregular cavalry, and rendering excellent service as scouts and skirmishers. In 1570 they built their principal "stanitza" and rendezvous, called Tcherkask, on the Don, not far above its mouth. As it was rendered unhealthy by the overflowing of the island on which it stood, New Tcherkask was founded in 1805 some miles from the old city, to which nearly all the inhabitants removed. This forms the capital of the country of the Don Cossacks, which constitutes a government of Russia, and has an area of 61,900 sq. miles and a population of 1,474,133. It has a military organization of its own.

**COSTA RICA**, the most southern state of the republics of Central America; bounded n. by Nicaragua, e. and n. by the Caribbean Sea; e. and s. by Colombia; and s. and w. by the Pacific. Area, about 23,200 sq. miles. The capital is San José, and the two established ports are Punta Arenas, on the Pacific side, and Port Limon, on the Caribbean Sea. It has been an independent state since 1821, from 1824 to 1839, forming a part of the Central American Confederation, but subsequently separate. Pop. 243,000, mostly of Spanish descent.

**COSTER**, Laurens (called Janszoon, that is, son of John), whose name is connected with the origin of printing, was born in Haarlem in 1370 or 1371, died about 1440. According to a statement first found in Junius' Batavia (1588), he was the original inventor of movable types, and on this ground the Dutch have erected statues in his honor.

**COSTS**, in law, are the expenses incurred by the plaintiff and defendant. As a rule these are paid by the loser in a suit, but there are always extra-judicial expenses incurred by both parties, which each has to pay whatever be the issue.

of the suit. In criminal cases the party accused may have his expenses if the court thinks the accusation unreasonable. In matrimonial suits, the wife, whether petitioner or respondent, is generally entitled to her costs from the husband.

**COS'TUME**, the style of attire characteristic of an individual, community, class, or people; the modes of clothing, and personal adornment which prevail in any period or country.—Costume balls, also called fancy dress balls, are entertainments at which the guests adopt a style of dress different from the one usually worn. It may be one which was worn at another period, or one worn in another country, or a modern dress worn by some particular class of society. A favorite plan is to make up as some well-known character in history or literature.

**CÔTE-D'OR**, an inland and eastern department of France, part of the old province of Burgundy, having Dijon as its capital. Area, 3382 sq. miles. The vineyards of the eastern slopes of the Côte-d'Or produce the celebrated wines of Upper Burgundy. Iron, coal, marble, etc., are found. Pop. 381, 574.

**CÔTES-DU-NORD** (kōt-đu-nōr), a maritime department in the north of France, forming part of ancient Brittany; capital Brieuc. Area, 2659 sq. miles. Pop. 628,256.

**COTILLION**, a brisk dance of French origin, performed by eight persons together, resembling the quadrille which superseded it. The name is now given to a dance which often winds up a ball, and which is danced with any number of dancers and with a great variety of figures the pairs of dancers following in this the leading pair, and partners being successively changed.

**COTTON**, a vegetable fiber used extensively in the manufactures and highly valuable because of the ease with which it is grown and its structural value in the weaving arts. Cotton is cultivated in those parts of the globe



Cotton plant in bloom.

between the two thirty-fifth parallels of latitude (a region which contains the largest portion of the land surface of the globe), although its most profitable cultivation is between the twentieth and thirty-fifth parallels north of the equator. Within this belt lie the cotton districts of the United States, northern Mexico, Egypt, northern Africa, and Asia, except the extreme southern



parts of India and the Malay Peninsula. South of the equator cotton is grown in Brazil, nearly all of which country is said to be favorably adapted to its cultivation; in Australia, though not to any great extent; in Africa, where the extent of production is not known; and in the islands of the Pacific.

All the species are perennial shrubs, though in cultivation they are sometimes treated as if they were annuals. They have alternate stalked and lobed leaves, large yellow flowers, and a three or five celled capsule, which bursts open when ripe through the middle of the cell, liberating the numerous black seeds covered with the beautiful filamentous cotton. The North American cotton is produced by two well-marked varieties, the long-staple cotton, which has a fine soft silky fibre nearly two inches long, and the short-staple cotton, which has a fibre little over one inch long adhering closely to the seed. The long-staple variety known as Sea Island cotton holds the first place in the market. It is grown in some of the southern states of America, especially on islands bordering the coast. The mode of cultivation is usually as follows:—The seeds are sown in the spring in drills of about a yard in width, the plant appearing above ground in about eight days afterwards. The rows of young plants are then carefully weeded and hoed, a process which requires to be repeated at two or three subsequent periods. No hoeing takes place after the flowering has commenced, from which a period of 70 days generally elapses till the ripening of the seed. To prevent the lustre of the cotton wool from being tarnished, the pods must not remain ungathered longer than eight days after coming to maturity. The cotton wool is collected by picking with the fingers the flakes from the pods, and then spreading out to dry, an operation which requires to be thoroughly performed. The cotton now comes to be separated from the seeds, a process formerly effected by manual labour, but which is now generally accomplished by machinery. After being cleansed from the seeds, the cotton wool is formed into bales, and is now ready for delivery to the manufacturer.

Cotton has been cultivated in India and the adjacent islands from time immemorial. It was known in Egypt in the sixth century before the Christian era, but was then probably imported from India. It was not till a comparatively late period that the nations of the West became acquainted with this useful commodity, and even then it appears only to have been used as an article of the greatest luxury. The introduction of the cotton-shrub into Europe dates from the ninth century, and was first effected by the Spanish Moors, who planted it in the plains of Valencia. Cotton manufactories were shortly afterwards established at Cordova, Granada, and Seville; and by the 14th century the cotton stuffs manufactured in the Kingdom of Granada had come to be regarded as superior in quality to those of Syria. About the 14th century cotton thread began to be imported into England by the Venetians and Genoese. In

China the cotton-shrub was known at a very early period, but it does not appear to have been turned to any account as an article of manufacture till the sixth century of the Christian era, nor was it extensively used for that purpose till nearly the middle of the 14th century. In the new world the manufacture of cotton cloth appears to have been well understood by the Mexicans and Peruvians long before the advent of Europeans. It was planted by the English colonists of Virginia in 1621, but only as an experiment, and the amount produced was long very small, the crop only amounting to about 2,000,000 pounds in 1791. After this it rapidly increased, and in 1810 94,000,000 pounds were exported. The quantity now produced is enormous, the crop of 1906-7 being estimated at 13,551,000 bales, averaging 492 pounds each. The chief cotton growing states are Texas, Georgia, Mississippi, Alabama, South Carolina, Arkansas, Louisiana, North Carolina, Tennessee and Florida. The United States furnishes two-thirds of the cotton supply of the world. The raw cotton exported in 1907 was 9,036,434 bales of 500 pounds each.

As a general rule, cotton is a dry-weather plant, heavy rainfall interfering with both the culture and the stand, although an extremely dry spring interferes with the growth. The experiment stations in the southern states have aided in introducing improved methods of cultivating, fertilizing, and handling the crop. Rotation of crops and green manuring have been shown to be of great advantage. From the date of bloom, warm, dry weather is needful, until picking time, which usually commences from July 10 in Southern Texas, up to September 10 in Tennessee, and continues until frost puts a stop to further growth. During the harvest all available hands are called into full employment. The cotton is gathered into baskets or bags hung from the shoulders of the pickers, and when the crop has been secured it is spread out, dried, and then the fiber separated from the seeds. For long-staple or Sea Island cotton in South Carolina, the usual date to begin preparing land is February 1; planting begins April 1 and ends May 1; picking is from August 25 to December 10.

**COTTON**, Charles Stanhope, an American naval officer, born at Milwaukee, Wis., in 1843. He was graduated at the naval academy and took part in the battle between the Merrimac and Monitor in March, 1862. He was commander of the cruiser Harvard during the war with Spain.

**COTTON-FAMINE**, a term used to designate the stagnation of the cotton industry in England during the last years of the civil war, owing to the arrest by the war, of the industry of cotton growing in the U. States. Owing to this stagnation nearly 400,000 persons were thrown out of employment in England and maintained by charity for nearly two years.

**COTTON-GIN**, a machine invented by Eli Whitney in 1794 for separating the cotton fiber from the seed.

**COTTON-GRASS**, a kind of plant with long silky hairs upon the fruit. It grows freely in the U. States and is regarded as good food for sheep.

**COTTON INSECTS**, insects injurious to growing cotton, the chief of which is the larva of a moth. Millions of dollars are annually lost in crops owing to the ravages of this destructive insect. The moth is a night flier and deposits its eggs on the under side of the cotton leaf. Here they hatch during the summer and the worm feeds on the plant. The bud-worm is another insect destructive to cotton.

**COTTON SEED, COTTON SEED OIL**, the seed of the cotton plant and the oil extracted from it. After the oil has been pressed out of the cotton seed, the residuum is the pulp of the seed, called cotton seed stearine, or cotton seed cake. It is a highly valuable product for cattle food and fertilizer. The oil is used for cooking, for the adulteration of lard and lard oil, while the stearine is often used for the adulteration of lard. The hulls of the seed are used as a low grade food for animals.

**COTTON-SPINNING**, a term employed to describe in the aggregate all the operations involved in transforming raw cotton into yarn.

**COTTONTAIL**, the popular name of a small American hare.

**COTTON-WOOD**, a tree of the poplar kind, a native of N. America. The "cotton" from the seeds has been used in France and Germany for making cloth hats and paper, but the experiment was found unprofitable.

**COTURNIX**. See Quail.

**COTYLEDONS**, the seed-leaves or seed-lobes of the embryo plant, forming, together with the radicle and plumule, the embryo, which exists in every seed capable of germination. Some plants have only one cotyledon, and are accordingly termed monocotyledonous; others have two, and are dicotyledonous. These differences are accompanied by remarkable differences in the structure of the stems, leaves, and blossoms, which form the basis for the division of flowering plants into two great classes. The embryo plant of the Coniferæ has many (three to twelve) cotyledons, and is called polycotyledonous. The cotyledons contain a supply of food for the use of the germinating plant. In some plants the store is very large, and in germination the seed-leaves remain under the ground, as in the pea and oak; in others the store is not so large, and the seed-leaves appear above ground and perform the functions of true leaves; while there is a large class of seeds where the embryo is very small, and the food is stored up around it, as in wheat and the buttercup.

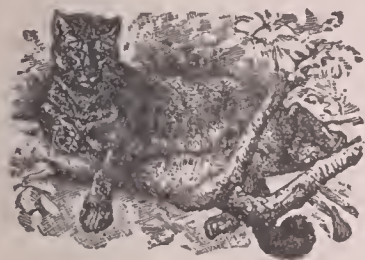
**COUCHANT**, in heraldry, said of a beast lying down with the head raised.

**COUES**, Elliott, an American zoologist and anatomist, born in New Hampshire in 1842, died 1899. He was naturalist for the Northern Boundary Commission in 1873-6 and from 1877 to 1887 was professor of anatomy at the National Medical college at Washington. He published numerous scientific works upon ornithology in which science he was a distinguished specialist.



**COUDERT**, Frederic Rene, an American lawyer and diplomat, born in New York in 1832. He appeared for the U. States before the International Bering Sea Commission and was a member in 1896-8 of the Venezuela Boundary Commission.

**COUGAR** (kō'gär), or **PUMA**, a quadruped of the cat kind, inhabiting most parts of America. Its color is a uniform fawn or reddish-brown, without spots



Cougar.

or markings of any kind. It may attain a length of 9 feet, inclusive of the tail. In habits it is stealthy and cowardly, and seldom or never attacks man. It is by some called the panther or red tiger, and is one of the most destructive of all the animals of America, particularly in the warmer climates, where it carries off fowls, dogs, cats, and other domestic animals.

**COUGH**, a sudden and forcible expiration immediately preceded by closure of the glottis or narrowed portion of the box of the windpipe. The force for the action is obtained by a deep breath, then follows the closure of the glottis, succeeded by the expiratory effort forcing open the glottis. The action is performed by the expiratory muscles, that is the abdominal muscles, by whose contraction the diaphragm is forced up, and the muscles of the chest, by which the ribs are pulled down. The cavity of the chest being thus diminished air is driven out of the lungs. The object of the cough is usually to expel any foreign material in the lungs or air-tubes. The offending material may be there present as the result of inflammation, catarrh, etc. It may also have gained entrance from without. Thus the irritating material may be merely some food or drink which has slipped into the larynx, or it may be dust, etc., in the air inhaled, and the cough is the means of expelling the intruder. But cough may also be produced when there is no irritating material present. The larynx or windpipe may be in an inflamed and irritable condition, in which state even the entrance of cold air will excite coughing. Moreover, cough may be produced by irritation of nerves, distant from the lungs and air-passages, by what is called reflex action. Thus irritation of the stomach, irritation connected with the ear, irritation of certain nerves by pressure of growths, etc., may produce cough, when the respiratory organs are not directly affected at all. Irritation at the back of the throat, as of the tickling of a long uvula, and so on, also produces it. A catarrhal cough is generally considered unimportant, particularly if there be no fever connected with it. But every cough lasting longer

than two or three days is suspicious, and ought to be medically treated.

**COUNCIL**, an assembly met for deliberation, or to give advice. The term specially applies to an assembly of the representatives of independent churches, convened for deliberation and the enactment of canons or ecclesiastical laws. The four general or œcumenical councils recognized by all churches are: 1, the Council of Nice, in 325, by which the dogma respecting the Son of God was settled; 2, that of Constantinople, 381, by which the doctrine concerning the Holy Ghost was decided; 3, that of Ephesus, 431; and 4, that of Chalcedon, 451; in which two last the doctrine of the union of the divine and human nature in Christ was more precisely determined. Among the principal Latin councils are that of Clermont (1096), in the reign of Urban II., in which the first crusade was resolved upon; the Council of Constance, the most numerous of all the councils, held in 1414, which pronounced the condemnation of John Huss (1415), and of Jerome of Prague (1416); the Council of Basel, in 1431, which intended a reformation, if not in the doctrines, yet in the constitution and discipline of the church; and the Council of Trent, which began its session in 1545, and labored chiefly to confirm the doctrines of the Catholic Church against the Protestants. On the 8th of December, 1869, an œcumenical council, summoned by a bull of Pope Pius IX., assembled at Rome. This council adopted a dogmatic Decree or *Constitutio de Fide*, and a *Constitutio de Ecclesia*, the most important article of which latter declares the infallibility of the pope when speaking *ex cathedra*.

**COUNCIL BLUFFS**, a city and important manufacturing center, Pottawattamie Co., Iowa, on the left bank of the Missouri, opposite Omaha City, with which it is connected by a bridge 2750 feet in length and 50 feet above high water. The name is derived from a council held here with the Indians in 1804. Pop. 35,000.

**COUNCIL OF WAR**, an assembly of officers of high rank called to consult with the commander-in-chief of an army or admiral of a fleet on matters of supreme importance.

**COUNSEL**, a person retained by a client to plead his cause in a court of judicature.

**COUNT**, in modern times the custom of styling all the sons of a count also counts makes this designation on the Continent very common, and the rank little more than nominal. In point of rank, the English earls are considered as corresponding to the continental counts, an earl's wife being styled a countess.

**COUNT**, in law, an independent part of a declaration or indictment, which, if it stood alone, would constitute a ground of action.

**COUNTERFEITING**, a term generally applied to the making of imitation money, coin or paper. The U. States secret service has examples of counterfeit coins and bills so like the original that they are distinguished only with the greatest difficulty by experts. An enormous amount of counterfeit money

must be in constant circulation. The crime is a felony.

**COUNTER-IRRITANT**, in med. a substance employed to produce an artificial or secondary disease, in order to relieve another or primary one. The term is more specifically applied to such irritating substances, as, when applied to the skin, redden or blister it, or produce pustules, purulent issues, etc. The commonest counter-irritants are such as mustard, turpentine, cantharides or Spanish flies, croton oil, and the cautery.

**COUNTERPOINT**, in music, a term equivalent to harmony, or the writing of a carefully planned accompanying part; or that branch of the art which, musical thought being given, teaches the development of it, by extension or embellishment, by transposition, repetition, or imitation throughout the different parts. Counterpoint is divided into simple, florid or figurate, and double. Simple counterpoint is a composition in two or more parts, the notes of each part being equal in value to those of the corresponding part or parts and concords. In florid counterpoint, two or more notes are written against each note of the subject, or *canto-fermo*, and discords are admissible. Double counterpoint is an inversion of the parts, so that the base may become the subject, and the subject the base, etc., thus producing new melodies and new harmonies.

**COUNTERSIGN**, a private signal, word, or phrase given to soldiers on guard, with orders to let no man pass unless he first give that sign; a military watchword.

**COUNTY**, an administrative unit of a state or a government, or the territory ruled over by a count. In England the term shire is used instead of county. Counties in the U. States are in reality units of administration, which each send one or more representatives to the state legislature. Counties have taxing power, prosecute crime, and administer justice generally. Cities are parts of counties, a city often being coterminous with a county, as Chicago and Philadelphia. New York includes four counties. St. Louis has a separate charter and has no connection with the county, sending its own members to the legislature.

**COUNTY COUNCILS**, administrative bodies created by the British parliament in 1888 to replace the justices of the peace who had formerly administered county affairs and to give local self-government to the counties. These councils are elective administrative bodies, and were perfected in 1894 by the local self-government act.

**COUNTY COURT**, a tribunal of justice the jurisdiction of which is limited to the county in which it exists. In this much the English and the American county courts are much the same thing, although the county court in England is a relatively more important body.

**COUP** (kō), a term used in various connections to convey the idea of promptness and force.—*Coup de main*, a prompt, vigorous, and successful attack.—*Coup d'état*, a sudden decisive blow in politics; a stroke of policy; specifically, an exertion of prerogative to alter the laws or the constitution of a country

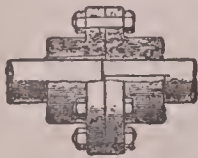


without the consent or concurrence of the people expressed through their representatives, especially when such exertion is supported by armed force.—*Coup de soleil*. See *Sunstroke*.

**COUPLE**, in dynamics, two equal and parallel forces acting in different directions, and applied to the same body. The distance between their lines of action is called the arm of the couple, and the product of one of the two equal forces by this arm is called the moment of the couple.

**COUPLET**, two verses or lines of poetry of equal length and rhythm, often embodying an idea of the nature of an aphorism.

**COUPLING**, in machinery, a contrivance for connecting one portion of a system of shafting with another, and of which there are various forms. A common form is the flange or plate coupling, which consists of two flanges separately



Flange coupling.

fitted on to the two contiguous ends of the lengths of shaft to be connected, and firmly secured together by screws. The most useful kinds of couplings are those that are adjustable, or can be readily put on and off.—The term is also applied to an organ register, by which two or more rows of keys can be connected by a mechanism, so that they can be played together.

**COUPON** (kō'pan), an interest-certificate printed at the bottom of transferable bonds, and so called because it is cut off or detached and given up when a payment is made. Also one of a series of tickets which binds the issuer to make certain payments, perform some service, or give value for certain amounts at different periods, in consideration of money received.

**COURIER**, a bearer of special despatches, whether public or private; also an attendant on a party traveling abroad, whose especial duty is to make all arrangements at hotels and on the journey.

**COURLAND**, a government in Russia, bounded n. by Livonia and the Gulf of Riga, w. the Baltic, s. Kovno, and c. by Vitebsk; area, 10,535 sq. miles; pop. 712,700.

**COURSING**, a kind of sport in which hares are hunted by greyhounds, which follow the game by sight instead of by scent.

**COURT**, a term generally applied to the judicial part of a government's machinery, and sometimes to bodies with judicial powers to settle disputes outside of litigation, properly so called. Courts have existed in all ages and are an evolution from the power of the chief or king in savage or prehistoric peoples. In England and the United States courts are essentially the same and have the same powers, although there are a few minor differences. In the United States two distinct systems of courts exist, the federal courts which,

with the exception of the supreme court (a constitutional creation) are the creation of the congress, and state courts which, (with the exception of the state supreme court) are creatures of the state legislature. In the federal system there is a court of claims, courts for the various territories, district courts and circuit courts, the judges of which are all appointed by the president and retain their positions on good behavior. The state courts consist of tribunals arranged with a view to the territory of the state and its divisions and the judges, as those also of the state supreme court are elected by the people. There are county courts, circuit courts, and appellate courts, the court of last appeal being the supreme court. The federal judiciary tries all cases concerned with the federal government, or cases of an interstate kind.

**COURT, MILITARY, COURTS-MARTIAL**, in the United States judicial bodies created by congress for the trial of offenses committed by soldiers. Soldiers, however, can be prosecuted in the civil courts for other than military offenses. Military courts are of several kinds, as general court, summary court, garrison court, regimental court, and court of inquiry.

**COURT-PLASTER** (so called because originally applied by ladies of the court as patches on the face), black, flesh-colored, or transparent silk varnished over with a solution of isinglass, which is often perfumed with benzoin, used for covering slight wounds.

**COUSIN** (kō-zan), Victor, French philosopher and writer, founder of the so-called Eclectic school of philosophy, was born at Paris 1792, died at Cannes 1867. The head and founder of the modern school of eclecticism in France, he borrowed from many sources. His eclecticism was based on the principle that every system, however erroneous, which has anywhere commanded assent, contains some elements of truth, by which its acceptance may be explained, and that it is the business of philosophical criticism to discover and combine these scattered elements of truth.

**COUTHON** (kō-tōn), Georges, a noted French revolutionist, was born in 1756, and was bred to the profession of a lawyer. Some time after the revolution he was chosen a member of the national assembly, and allying himself with Robespierre aided and abetted the latter in all his atrocities. On the downfall of Robespierre's party Couthon shared, along with him and St. Just, in the decree of arrest, and was guillotined, July 28, 1794.

**COUVADE** (kō-vād'), a singular custom prevalent in ancient as well as modern times among some of the primitive races in all parts of the world. After the birth of a child the father takes to bed, and receives the food and compliments usually given elsewhere to the mother. The custom was observed, according to Diodorus, among the Corsicans; and Strabo notices it among the Spanish Basques, by whom, as well as by the Gascons, it is still to some extent practiced. Travelers from Marco Polo downward have met with a somewhat similar custom among the Chinese,

the Dyaks of Borneo, the negroes, the aboriginal tribes of North and South America, etc.

**COVENANT**, in law, an agreement between two or more parties in writing signed, sealed, and delivered, whereby they agree to do, or not to do, some specified act. In theology, the promises of God as revealed in the Scriptures, conditional on certain terms on the part of man, as obedience, repentance, faith, etc.

**COVENANTERS**, in Scottish history, the name given to the party which struggled for religious liberty from 1637 on to the revolution; but more especially applied to the insurgents who, after the passing of the act of 1662 denouncing the solemn league and covenant as a seditious oath, took up arms in defense of the Presbyterian form of church government.

**COVENTRY**, a city in England, county of Warwick, 85 miles northwest of London. Coventry is the center of the ribbon trade, and manufactures also silk fabrics, cambric frilling, cottons, watches, machinery, and bicycles. It sends one member to parliament. Pop. 69,877.

**COVERDALE**, Miles, the earliest translator of the Bible into English, was born in Yorkshire in 1487, died 1568.

**COVINGTON**, a city of Kentucky, on the s. bank of the Ohio River, opposite Cincinnati, of which it is substantially a suburb, connected by means of bridges and ferries. It has a large general trade and manufacturing business. Pop. 50,145.

**COW**, the general term applied to the females of the genus *Bos* or *ox*, the most valuable to man of all the ruminating animals. Among the best breeds of dairy cows in Britain are the Devonshire, the Ayrshire, the shorthorn, the polled Angus or Aberdeenshire, and the Alderney. See *Ox* and *cattle*.

**COW-BERRY**, the red whortleberry, a procumbent shrub of high moorlands in Europe, Asia, and N. America, has evergreen box-like leaves, and produces a red acid berry used for jellies and preserves.

**COWBOYS**, a name first applied to cattle thieves during the war of the American Revolution and later to the herdsmen upon the large cattle ranches of Texas and the West. Cowboys are excellent horsemen and acquire great skill in catching and "rounding up" the cattle on a large range. They are proverbial for their generosity and manliness.

**COW-BUNTING**, an American bird about the size of the sky-lark. It drops its eggs into the nests of other birds to be hatched by them, but has never been known to drop more than one egg into the same nest. It is migratory spending its winters regularly in the lower parts of North and South Carolina and Georgia, and appearing in Pennsylvania about the end of March. These birds often frequent corn and rice fields in company with the red-winged tropicbirds, but are more commonly found accompanying the cattle, feeding on seeds, worms, etc.

**COWLEY** (kou'li), Abraham, an English poet of great celebrity in his day, was born at London in 1618, died 1667.



## COWPER

He published his first volume, *Poetic Blossoms*, at the age of fifteen. He took a considerable interest in science, and was one of the founders of the Royal Society. His chief works are: *Love's Riddle*, a pastoral comedy; *Da-*



Young cow-bunting fed by female yellow-throat.

*videis*, a scriptural epic; *Naufragium Joculare*; *The Mistress*, a collection of love verses; *Pindarique Odes*; *Liber Plantarum*; etc.

**COWPER** (kō'pēr or kou'pēr), William, English poet, born at Berkhamstead in 1731, died at East Dereham, in Norfolk, 1800. In 1776, on the advice of Mrs. Unwin, he commenced a poem on the *Progress of Error*, which he followed by three other poems, *Truth*, *Table-talk*, and *Expostulation*; these with some others were published in a volume in 1782. The *Task*, together with *Tirocinium*, formed a second volume in 1785. The *History of John Gilpin* is also due to the suggestion of Lady Austen. The translation of *Homer*, begun in 1784, occupied him for the next six years, and was published in 1791. He removed during its progress, in 1786, from Olney to Weston. In the beginning of 1794 he was again attacked with madness, which was aggravated by the death of Mrs. Unwin in 1796. The revisal of his *Homer*, and the composition of some short pieces, occupied the latter years of his life. He is considered among the best of descriptive poets.

**COW-POX**, the vaccine disease which appears on the teats of the cow, in the form of vesicles of a blue color, approaching to livid. These vesicles are elevated at the margin and depressed at the center; they are surrounded with inflammation and contain a limpid fluid. This fluid or virus is capable of communicating genuine cow-pox to the human subject, and of protecting against small-pox either completely, or, at least, against the virulent form of the disease. See *Vaccination*.

**COW'SLIP**, the popular name of several varieties of a favorite wild flower found in pastures. It has umbels of small, buff-yellow, scented flowers on short pedicels. Its flowers possess sedative properties, and have been used as an anodyne, a sort of wine being prepared from them.

**COW-TREES**, a name of various trees having an abundance of milky juice especially a South American tree, which, when wounded, yields a rich milky nutritious juice in such abundance as to render it an important article of food.

This fluid resembles in appearance and quality the milk of the cow. The tree is common in Venezuela, growing to the height of 100 ft. The leaves are leathery, about 1 ft. long and 3 or 4 inches broad.

**COX**, Kenyon, an American painter, born in Ohio in 1856. He studied painting in Paris and on his return to New York painted several portraits which became well known.

**COX**, Palmer, an American artist and illustrator, born in Quebec in 1840. His most widely known work is his quaint *Brownies*, consisting of drawings and verses.

**COX**, Samuel Sullivan, an American author and legislator, born in Ohio in 1824, died in 1889. He was congressman from 1857 almost continually until his death representing districts in Ohio and New York to which state he removed in 1866. He was minister to Turkey in 1885-6. Cox published several light books of politics and travel. He was nicknamed "Sunset Cox" because of one of his glowing descriptions.

**COYOTE**, the American prairie wolf, several varieties of which inhabit the Western United States and British Columbia. The animal is noted for its



The cathedral, Cracow.

disconcerting and continuous yelping during the night. It travels in packs, is as large as a setter dog, and seldom attacks men. The hair is reddish-yellow tipped with black.

**CRAB**, a popular name for all the ten-footed, short-tailed crustaceans comprising many genera, distinguished from the lobster and other long-tailed decapods by the shortness of their tail, which is folded under the body. Most inhabit the sea, others fresh water, some the land, only going to the sea to spawn. Of the crabs several species are highly esteemed as an article of food, and the fishery constitutes an important trade on many coasts.

**CRAB**, a name given to various machines, especially to a kind of portable windlass or machine for raising weights, etc. Crabs are much used in building operations for raising stones or other weights, and in loading and discharging vessels.

**CRAB-APPLE**, a small, wild, very sour species of apple. See *Apple*.

**CRACOW**, the old capital of Poland, in 1815-46 capital of a republic of the same name now forming part of Austrian Galicia, is situated on the left bank of the Vistula, where it becomes navigable, and consists of Cracow proper, or the old city, and several suburbs. It is the see of a bishop, is well built and regularly fortified. The cathedral, a fine old Gothic edifice, contains monuments of many Polish kings, of Kosciusko, etc. The university was founded in 1364, but gradually fell into decay, and was reorganized in 1817. It has a library of 300,000 volumes. On a hill near the town stands the monument of Kosciusko, 120 feet high. Pop. 74,593 (21,000 being Jews); with all its suburbs, 94,696.

**CRADLE OF LIBERTY**, a name often applied to Faneuil Hall, Boston, owing to the early indignation meetings against British rule held there.

**CRAFTS**, James Mason, an American chemist, born in Boston in 1839. His investigations have been chiefly concerned with organic chemistry and also with physical chemistry. His method of making certain compounds synthetically is one of the most important

of the recent discoveries in chemistry. Crafts has been honored with membership in several learned societies of Europe and America.

**CRAIK**, Dinah Maria, English novelist, born at Stoke-upon-Trent 1826, her father's name being Mulock. She became the wife of George Lillie Craik in 1865. She published a volume of poems under the title of *Thirty Years*; many essays and papers on ethical and domestic subjects; books for young people, and about twenty-four novels, the best of which are: *John Halifax, Gentleman*; *A Life for a Life*; *Agatha's Husband*; and *The Woman's Kingdom*. She died in 1887.

**CRAMP**, an involuntary contraction of a voluntary muscle produced by cold or by long continued action. It can be removed by heat or friction. When a swimmer is attacked by cramp of the leg-muscles he should turn on his back, "float," and vigorously rub the



muscles of the legs. Cramp accompanies colic, cholera, and tetanus, and often attacks the muscles of persons who use the hands continuously, such as writers, telegraph operators, etc.

**CRAMP**, Charles Henry, an American ship builder born at Philadelphia in 1828, and head of the Cramp Ship Building Compoany. It was this company that built the battleship Maine which was destroyed in Havana Harbor Feb. 15, 1898.

**CRAN'BERRY**, a native of Europe, N. Asia, and N. America. The berry, when ripe, is globose and dark red, and a little more than  $\frac{1}{4}$  inch in diameter. These berries form a sauce of exquisite flavor, and are used for tarts. The American cranberry, a native of Canada and the U. States, has larger berries than the European species, and is extensively cultivated in some localities.

**CRANE**, the common name of birds of the genus *Grus*. They are generally of considerable size, and remarkable for their long necks and stiltlike legs, which eminently fit them for living in marshes



Crowned crane.

and situations subject to inundations, where they usually seek their food. This is partly of vegetable matter, but they also devour insects, worms, frogs, lizards, reptiles, small fish, and the spawn of various aquatic animals. They build their nests among bushes or upon tussocks in marshes, and lay but two eggs. Cranes annually migrate to distant regions, and perform voyages astonishing for their great length. The common crane has the general plumage ash-gray, the throat black, the rump ornamented with long, stiff, and curled feathers, the head with bristly feathers; legs black; length about 4 feet. It inhabits Europe, Asia, and the north of Africa. The crowned crane has the general plumage bluish ash-gray, the tail and primary quills black, the wing coverts pure white; the head is crowned with a tuft of slender yellow feathers, which can be spread out at pleasure. It inhabits North and West Africa. The demoiselle crane is so called from the elegance of its form. It is ash-gray, and the head is adorned with two tufts of feathers formed by a prolongation of the ear-coverts. Its habitat is Africa and the south of Europe. Among North American species are the whooping crane, a larger species than the common crane, and the brown or sand-hill crane.

**CRANE**, a machine for raising great weights and depositing them at some distance from their original place, for example, raising bales from the hold of a

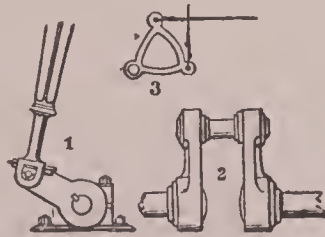
ship and depositing them on the quay. Cranes are generally constructed on the principle of the wheel and axle, cog-wheel, or wheel and pinion. A very efficient wheel-and-pinion crane much used on quays consists of a jib or transverse beam, inclined to the vertical at an angle of from  $40^\circ$  to  $50^\circ$ , which, by means of a collar, turns on a vertical shaft. The upper end of the jib carries a fixed pulley, and the lower end a cylinder, which is put in motion by a wheel and pinion. The weight is made fast to a rope or chain which passes over the pulley and is wound round the cylinder. On turning the cylinder (either by a winch handle attached to the wheel which works in the pinion, or by the application of steam-power) the weight is raised as far as necessary. The jib is then turned on its arbor till the weight is brought immediately over the spot where it is to be deposited, and the moving power is withdrawn so as to allow the weight to descend by its own gravity.

**CRANE**, Stephen, an American writer, born in Newark, N. J., in 1870, died 1900. He was early a war-correspondent and published several military stories, the chief of which was *The Red Badge of Courage* (1896).

**CRANE**, William Henry, an American actor, born in Massachusetts in 1845. He became noted in 1877 for his power of comedy when he appeared with Stuart Robson in *Our Boarding House*. Crane for many years was the leading spirit in the joint performance with Robson in which the partners played the two Dromios in Shakespeare's *Comedy of Errors*. After his separation from Robson he attempted Falstaff but with poor success.

**CRA'NIUM**. See Skull.

**CRANK**, an iron axis with the end bent like an elbow, serving as a handle for communicating circular motion; as, the crank of a grindstone; or for changing circular into longitudinal motion, as in some saw-mills, or longitudinal into circular motion, as in a steam-engine. The single crank (1) can only be used on the end of an axis. The



1 Single crank. 2, Double crank.  
3, Bell crank.

double crank (2) is employed when it is necessary that the axis should be extended on both sides of the point at which the reciprocating motion is applied. An exemplification of this arrangement is afforded by the machinery of steam-boats. The bell-crank (3), so called from its being much used in bell-hanging, is for a totally different purpose to the others, being used merely to change the direction of motion, as from a horizontal to a vertical line.

**CRAN'MER**, Thomas, Archbishop of Canterbury, and famous for the part he played in the English reformation during the reign of Henry VIII., was born at Aslacton, Notts, in 1489; executed by burning at Oxford, 1556. An opinion which he gave on the question of Henry VIII.'s proposed divorce from Catharine brought him under the favorable notice of the king. Cranmer was sent for to court, made a king's chaplain, and commanded to write a treatise on the subject of the divorce. In 1530 he was sent abroad with others to collect the opinions of the divines and canonists of France, Italy, and Germany, on the validity of the king's marriage. At Rome he presented his treatise to the pope, but his mission was fruitless. In January, 1533, he was appointed Archbishop of Canterbury. Soon after he set the papal authority at defiance by pronouncing sentence of divorce between Henry and Catharine, and confirming the king's marriage with Anne Boleyn. The pope threatened excommunication, and an act of parliament was immediately passed for abolishing the pope's supremacy, and declaring the king chief head of the Church of England. In 1536 he pandered to Henry's passions by promoting the divorce of Anne Boleyn. He was sent to the Tower on the accession of Mary. He was tried and was sentenced to be degraded and deprived of office. After this flattering promises were made, which induced him to sign a recantation of his alleged errors, and become in fact, a Catholic convert. But when he was brought into St. Mary's Church, Oxford, to read his recantation in public, instead of confessing the justness of his sentence, and submitting to it in silence or imploring mercy, he calmly acknowledged that the fear of death had made him belie his conscience; and declaring that nothing could afford him consolation but the prospect of extenuating his guilt by encountering, as a Protestant penitent, with firmness and resignation, the fiery torments which awaited him. He was immediately hurried to the stake, where he behaved with the resolution of a martyr.

**CRAPE**, a light transparent stuff, like gauze, made of raw silk, gummed and twisted on the mill, woven without crossing, and much used in mourning.

**CRAPS**, a dice game. When the amount of the stake is decided upon the first player throws the dice. If the number thrown is two, three or twelve he loses. If seven or eleven he wins. If none of these numbers is thrown he keeps on "shooting" until he again throws the first number, when he wins, or seven, when he loses.

**CRATER**, the orifice or mouth of a volcano. Craters may be central or lateral, and there may be several subsidiary ones, which may shift their places, or become merged by subsidence into others.

**CRAVAT'**, a neckcloth; an article of silk, muslin, or other material, worn by men about the neck; so called from Fr. *cravate*, a Croat, because this piece of dress was adopted in the 17th century



from the Croats who entered the French service.

**CRAWFISH**, or **CRAYFISH**, a name of various crustaceous animals, the common crawfish being the river lobster, a macrurous (long-tailed), ten-footed crustacean, resembling the lobster in appearance and habits. The crawfish by their burrowing habits injure mill-dams and the levees of the Mississippi. Crawfish are regarded by many as furnishing a delicate dish for the table.

**CRAWFORD**, Francis Marion, an American novelist, born in Italy in 1854. His first publication was Mr. Isaacs 1882, since which time he has produced an average of two novels a year. His principal stories are laid in Italy. Died 1909.

**CRAY'ONS**, colored pencils obtained from certain mineral substances in their natural state, but more commonly manufactured from a fine paste of chalk or pipe-clay colored with various pigments, and consolidated by means of gum, wax, etc. A kind of crayon painting (or pastel painting) is practiced to some extent, the coloring matter in a soft state being rubbed on with the finger. Its chief advantages consist in the great facility of its execution, and the soft beauty and richness of coloring of effects so easily produced. The paper used has a specially granulated surface.

**CREAM**, the yellowish, thick, oily layer which forms at the surface when new milk is allowed to remain at rest. When it is agitated or churned butter is formed.

**CREAMERY**, a name applied to a factory where butter is made. The growth of the creamery industry in the U. States has been enormous since its beginning in 1864. The creamery is usually situated in the middle of a milk producing region and the milk is delivered daily to the factory, and the butter is manufactured by machinery at a great reduction in cost. The largest creamery district in the U. States is that near Elgin, Ill.

**CREAM OF TARTAR**, or **POTASSIUM BITARTRATE**, exists in grapes, tamarinds, and other foods. It is prepared from the crystalline crust (crude tartar or argol) deposited on the vessels in which grape juice has been fermented. The argol is dissolved by boiling with water, the mixture filtered, and the cream of tartar allowed to crystallize out. The commercial product usually contains a small percentage of calcium tartrate. It is frequently employed in medicine for its diuretic, cathartic, and refrigerant properties; as a mordant in dyeing wool; and as an ingredient in baking-powder.

**CRE'ASOTE**, a substance discovered by Reichenbach about 1831 in wood-tar, from which it is separated by a tedious process. It is generally obtained, however, from the products of the destructive distillation of wood. In a pure state it is oily, heavy, colorless, has a sweetish burning taste and a strong smell of peat smoke or smoked meat. It is a powerful antiseptic. Wood treated with it is not subject to dry-rot or other disease. It has been used in surgery and medicine with great success.

**CREASY** (krē'si), Sir Edward Shepherd, English historian, was born at Bexley, Kent, in 1812, died 1878. His principal works are: The Rise and Progress of the British Constitution, and The Fifteen Decisive Battles of the World.

**CREA'TIONISM**, the doctrine that a soul is specially created for each human fetus as soon as it is formed in the womb: opposed to traducianism, which teaches that the souls of children as well as their bodies are begotten by reproduction from the substance of the parents; and to infusionism, which holds that souls are pre-existent, and that a soul is divinely infused into each human fetus as soon as it is formed by generation. Many theologians, however, regard the mode of the soul's coming into being as a part of the mystery which envelops the whole subject of the existence and transmission of life. The term creationism has also recently been applied to that theory of the origin of man which is opposed to evolution.

**CRECHE** (krāsh), a public nursery for the children of poor women who have to work out during the day, where for a small payment they are nursed and fed during the day, remaining with their parents at night. These institutions were first started in Paris in 1844; they were soon afterward introduced into Great Britain, and are now common in large towns in the U. States.

**CRECY**, or Cressy, a small town of France, in the department of Somme, 9 miles north of Abbeville and 100 miles north of Paris; pop. 1,748. It is cele-

brated on account of a battle fought here, August 26, 1346, between the English and French. Edward III. and his son, the Black Prince, were both engaged, and the French were defeated with great slaughter, 30,000 foot and 1,200 horse being left dead on the field; among whom were the King of Bohemia, the Count of Alençon, Louis, count of Flanders, with many others of the French nobility.

each other's honesty, solvency, and resources. By means of a credit system a comparatively small stock of money can be made to do duty for carrying on a number of different transactions; but it is indispensable for every good system of credit that money must be instantly available when required, and this principle applies to every species of transaction where postponed payment is concerned. Public credit is the confidence which men entertain in the ability and disposition of a nation to make good its engagements with its creditors; or the estimation in which individuals hold the public promises of payment, whether such promises are expressed or implied. The term is also applied to the general credit of individuals in a nation; when merchants and others are wealthy and punctual in fulfilling engagements; or when they transact business with honor and fidelity; or when transfers of property are made with ease. So we speak of the credit of a bank when general confidence is placed in its ability to redeem its notes, and the credit of a mercantile house rests on its supposed ability and probity, which induce men to trust to its engagements. When the public credit is questionable it raises the premium on loans.

**CREDIT**, Letter of, an order given by bankers or others at one place to enable a person to receive money from their agents at another place.

**CREDIT FONCIER** (krā-dē fon-syā), a peculiar mode of raising money on land in France, the peculiarity of which is that the advance must not exceed



7 Battlefield of Crécy.

one-half of the value of the property pledged or hypothecated, and that the repayment of the loan is by an annuity terminable at a certain date. Several companies have been established by the French government with the privilege of making such loans.

**CREDIT MOBILIER** (krā-dē mō-bēlyā), a scheme which originated in France in 1852, its objects being to undertake trading enterprises of all kinds on the principle of limited liability, to buy up existing trading companies, and to carry on the business of bankers and stock-jobbers.

**CREDITOR**, one who has given credit to another. Creditors are "general,"



when they have only right of action against the debtor; "secured," when they have a lien protecting them; "preferred" when the law secures them a special right in preference to other creditors. A judgment creditor is one who secured judgment against a debtor.

**CREED**, a summary of belief, from the Latin *credo* (I believe), with which the Apostles' and Nicene Creeds begin. These two creeds, together with the Athanasian Creed, are the most ancient authoritative Christian creeds, though numerous ancient formularies of faith are preserved in the writings of the early fathers, Irenæus, Origen, Tertullian, etc., which agree in substance, though with some diversity of expression. The Nicene Creed was so called from being adopted as the creed of the church at the Council of Nicæa or Nice, 325 A.D., though its terms were subsequently somewhat altered. The Apostles' Creed probably dates from the end of the 4th century; but there is no evidence of its being accepted in its present form till the middle of the 8th. The Athanasian Creed was certainly not drawn up by St. Athanasius, as there is no sufficient evidence for its existence before the end of the 8th or beginning of the 9th century. In addition to these three creeds, the Roman Catholic Church has the creed of Pius IV., put forth in 1564, and consisting of the Nicene Creed with additional articles adopted by the Council of Trent, to which is now added a profession of belief in the definitions of the Vatican Council. The English Church adopts as "thoroughly to be received and believed" the three ancient creeds, which as part of her liturgy may be read in the Book of Common Prayer, but does not consider any of them to be inspired. Besides the creeds, there are numerous Confessions of Faith, which have been adopted by different churches and sects. The Thirty-nine Articles of the Book of Common Prayer form a confession of faith for the Anglican Church. The creed of the Church of Scotland and other Presbyterian churches is contained in the Confession of Faith, drawn up by the Westminster Assembly of Divines, and completed in 1646.

**CREEDMOOR**, a station on the Long Island railway, 11 miles east of the city of New York. It is much frequented by riflemen for target practice.

**CREEK**, a small inlet, bay, or cove; a recess in the shore of the sea or of a river. In America and Australia the term is often applied to a small river or rivulet.

**CREEKS**, American Indians formerly in Georgia and Alabama, but now planted in the Indian Territory. The number of warriors used to amount to about 6000, but altogether the tribe does not now exceed 15,000. They have made considerable progress in agriculture, and raise horses, cattle, fowls, and hogs, and cultivate tobacco, rice, and corn.

**CREEPERS**, a family of birds which strongly resemble the woodpeckers in their habit of creeping on the stems of trees with the aid of the strong quills which project from the tail-feathers,

and of securing their insect food by an exsertile tongue. The common creeper is European, but is represented by American species. It is a pretty and interesting little bird, which builds its nest usually in holes or crevices of trees. The wall-creeper of Southern Europe searches for its insect food on rocks. The family is found in all parts of the world.

**CREMA'TION**, the burning of the bodies of the dead, a practice which was frequent in ancient times instead of burial, and which has recently been advocated on hygienic grounds by many scientific men in Europe and America on account of the dangers to the living caused by the presence of graveyards and cemeteries. Various methods of cremation have been proposed, the great difficulty being to consume the body without permitting the escape of noxious exhalations, and without mingling the ashes with foreign substances. In Siemens' process, a modification of a plan of Sir Henry Thompson, this is successfully accomplished. Cremation societies exist in many countries, and crematories have been erected in or near not a few towns.

**CREMA'NA**, a city of Italy, capital of province of same name, on the left bank of the Po, 47 miles s. e. by e. of Milan. It is surrounded by walls and wet ditches, its circumference being nearly five miles. The most remarkable edifice is the cathedral, begun in 1107 and completed about 1491. Close by and connected with the cathedral, is the Torazzo, one of the loftiest and most beautiful towers in Italy. Cremona is the seat of a bishopric, and has considerable manufactures of silk, wool, cotton, etc. It was at one time celebrated for its violins, especially those made by Antonius Stradivarius, Joseph Guarnerius, and members of the Amati family. Pop. 37,693. The province has an area of about 500 sq. miles, and a population of 300,000.

**CRE'OLE** is the name which was originally given to all the descendants of Spaniards born in America and the West Indies. It is now used in a wider sense to signify the descendants of Europeans of any nation born in S. America and the West Indies, as well as in some other localities.

**CREOSOTE**. See Creasote.

**CRESCENDO** (kre-shen'dō), or Cres. (Italian), a musical term signifying that the notes of the passage over which it is placed are to be gradually swelled.

**CRES'CENT**, an emblem representing the moon in her horned state. This emblem is of very high antiquity, being that of the Greek goddess Artemis or Diana. It is found on medals of many ancient cities, particularly of Byzantium, from whence it is supposed to have been borrowed by the Ottomans. Since their establishment in Europe it has been the universal emblem of their empire. The crescent has given name to a Turkish order of knighthood from the form of the badge, instituted by Selim, sultan of Turkey, in 1801.

**CRESS**, the name of several species of plants. Water-cress is used as a salad, and is valued in medicine for its antiscorbutic qualities. The leaves have a

moderately pungent taste. It grows on the brinks of rivulets and in moist grounds.

**CRESELLE** (kre-sel'), a wooden rattle used in some Roman Catholic countries during Passion Week instead of bells, to give notice of divine worship.

**CRSSET**, a name which appears to have been given in the middle ages and later indifferently to the fixed candlesticks in great halls and churches, to the



Various forms of cressets.

great lights used as beacons and otherwise; and to lamps or fire-pans suspended on pivots and carried on poles in processions, municipal and military watches, etc.

**CRESSY**. See Crécy.

**CRETA'CEOUS** (or Chalk) **SYSTEM**, in geol. the upper strata of the Secondary series, immediately below the Tertiary series, and superincumbent on the Oolite system. This group is common to Europe, and also to a part of Asia. It consists of chalk resting upon arenaceous and argillaceous deposits, which are also regarded as part of the system.

**CRETE**. See Candia.

**CRETINISM**, a form of idiocy associated with a peculiar condition of the body, occurring in Switzerland and other mountainous countries. Cretins are usually affected with goitre, and are usually the offspring of goitrous parents. They are ill grown and stunted, with swollen bellies. The skin is coarse, head large, the nose sunken and flattened at the bridge, the lips thick, chin protruding, mouth wide and gaping, the tongue large. The countenance is dull and heavy; there is general muscular weakness and slowness of sensibility. Associated with these are feebleness or want of intellect, varying in degree from absolute vacuity to a certain power of acquiring a little knowledge; sometimes deafness and dumbness, perhaps squinting and blindness. Careful training may do much for them, along with good food, cleanliness, exercise, etc.

**CRETONNE** (kre-ton'), a cotton cloth with various textures of surface, printed on one side with pictorial and other patterns, and used for curtains, covering furniture, etc.

**CREUSE** (kreuz), an inland department, France, comprising most part of the old province of Marche; area, 2150 sq. miles. Pop. 284,942.

**CRIB'BAGE**, a game at cards played with the whole pack. It may be played by two, three, or four persons; and when by two, five or six cards may be dealt to each. Five-card cribbage played by two persons is the most scientific game. Sixty-one-points make the game; there are no tricks and no trumps, the object being to make pairs, fiftens, sequences, or the go, or prevent the adversary from doing the same. Court



cards and tens count as ten each, and all the rest count for the number of "pips" upon them. Every pair, that is, every couple of cards of the same value belonging to different suits (two aces, two fours, two kings, etc.), counts two; and when there are three or four similar cards, as many pairs are counted as there are different combinations of the cards taken two at a time. Every combination of cards, the united pips of which make up fifteen, counts two. A sequence consists of three or more cards of any suit following one another in rank, and counts one for each card. When the player whose turn it is to play cannot play a card without going beyond thirty-one, the other player scores one for having been the nearest to thirty-one. This is called scoring one for "the go." The remaining cards after thirty-one, or the next point to it, is made, are thrown up, and each player's cards are counted. When all the cards in a hand, either with or without the turn-up card, are of one suit, or when all the cards in the crib, with the turn-up card, are of one suit, it is called a flush, and counts one for each card. When the turn-up card is a knave the dealer scores two ("two for his heels"). When a knave of the same suit with the turn-up card is found in the hand of either player, the player in whose hand it is scores one ("one for his nob").

**CRICHTON** (kri'ton), James, sur-named the Admirable, a Scottish celebrity, son of Robert Crichton, lord-advocate, was born in 1560, died about 1585. He was educated at the University of St. Andrews, and according to the current accounts of him, before his twentieth year, had run through the whole circle of the sciences, could speak and write to perfection ten different languages and was equally distinguished for his skill in riding, fencing, singing, and playing upon all sorts of instruments. He visited Paris, Genoa, Venice, Padua, etc., challenging all scholars to learned disputations, vanquishing doctors of the universities, and disarming the most famous swordsmen of the time in fencing. He was latterly tutor to a son of the Duke of Mantua, and is said to have been stabbed to the heart in a dastardly manner by his pupil. The story of his achievements seems to be rather highly colored; but he was extravagantly praised by Aldus Manutius the printer of Venice, by whom he was well known. He left some Latin poems, which are said to be possessed of no remarkable quality.

**CRICKET**, the house-cricket is about an inch long, with antennæ of about an inch and a half, of a pale yellowish color mixed with brown. By the friction of the peculiarly-formed wing-covers the males produce that stridulous sound by which these insects are so well known, and which has become associated with ideas of cheerful domestic comfort. They live in holes and crevices near fire places or in other warm situations, whence they come out at night to feed on crumbs and other fragments of food. The field-cricket makes a similar noise.

**CRICKET**, an open-air game played with bats, balls, and wickets on a place

of smooth green sward. It is played by two opposite sets or sides of players, generally numbering eleven each. Two wickets of three stumps each are pitched fronting each other at a distance of about 22 yards apart, the stumps being upright rods stuck in the ground, and projecting 27 inches. On the top of each set of stumps are placed two small pieces of wood called bails. After the rival sides have tossed for the choice of either taking the bat or fielding, two men are sent to the wickets bat in hand. The opposite or fielding side are all simultaneously engaged; one (the bowler) being stationed behind one wicket for the purpose of bowling his ball against the opposite wicket, where his coadjutor (the wicket-keeper) stands ready to catch the ball should it pass near him; the other fielders are placed in such parts of the field as is judged most favorable for stopping the ball after it has been struck by the batsman or missed by the wicket-keeper. It is the object of the batsman to prevent the ball delivered by the bowler reaching his wicket either by merely stopping it with his bat or by driving it away to a distant part of the field. Should the ball be driven any distance the two batsmen run across and exchange wickets, and continue to do so as long as there is no risk in being "run out," that is, of having the stumps struck by the ball while they are out of their position near the wickets. Each time the batsmen run between the wickets is counted as a "run," and is marked to the credit of the striker of the ball. If the batsman allows the ball to carry away a bail or a stump, if he knocks down any part of his own wicket, if any part of his person stops a ball that would have otherwise reached his wicket, or if he strikes a ball so that it is caught by one of the opposite party before it reaches the ground he is "out," that is, he gives up his bat to one of his own side; and so the game goes on until all the men on one side have played and been put out. This constitutes what is called an "innings." The other side now take the bat and try to defend their wickets and make runs as their rivals did. Generally after two innings each have been played by the contestants the game comes to an end, that side being the victors who can score the greatest number of runs.

**CRILLON** (krē-yōn), Louis des Balbes de Berton de, great French warrior of the 16th century, born in 1541, died 1615. He distinguished himself in five successive reigns.

**CRIME**, a term used to indicate sometimes a violation of the higher moral law, sometimes more specifically the violation of a certain group of the laws formulated by a nation. This group properly comprises in its scheme all offenses endangering the welfare of the community, as distinct from civil or private injuries, which are as between person and person, and terminate with the compensation of the injured. Hence, from the legal point of view crime is sometimes defined as an offense punishable by law directly, as opposed to an offense which the law punishes indirectly by granting damages to the person wronged. (See Criminal Law.) Whether

used in the legal or the moral sense crime implies freedom of will, the power of distinguishing between right and wrong, and a fulfilled intention. Hence, though the theoretic rule of common law is that all infraction of law is criminal and penal, it is held that young children, madmen, and idiots cannot commit crimes.

**CRIMEA**, The, a peninsula of southern Russia; area, 10,000 sq. miles. Three-fourths of the Crimea belongs to the regions of steppes, but the other part, confided entirely to the south, and stretching along the coast from west to east, abounds in beautiful mountain scenery. Here the valleys looking southward are luxuriant with vines and olive and mulberry plantations, while the northern slope gives a large yield in cereals and fruits. The climate, however, is unequal, and in winter is severe. The forests are of limited extent. Pop. estim. at 450,000. The chief town and port is Sebastopol. In 1783 the Russians took possession of the country; and with the view of over-awing the Turks the great naval arsenal of Sebastopol, occupying the most commanding position in the Black sea, was begun by Catharine II. in 1786. Its military resources were steadily developed up to the time of the Anglo-French campaign (see Crimean War) of 1854, when it fell into the hands of the allies.

**CRIMEAN WAR**, the struggle between England, France, and Turkey on the one hand, and Russia on the other, to prevent the undue preponderance of Russia in the east of Europe; 1854 to 1856. The old plans for the extension of Russian power conceived by Catharine II. and Potemkin were resuscitated by Nicholas I., who, believing that he had secured himself from interference on the part of Austria and Prussia, and that an Anglo-French alliance was impossible, prepared to carry them into action. Servia, Bosnia, Bulgaria, and the principalities of the Danube were to become Russian protectorates, and Constantinople was to be provisionally occupied by Russian troops. The first markedly aggressive step—the demand by Russia for a protectorate over the Greek Church throughout the Turkish empire—brought matters to a crisis. An ultimatum presented by Menschikoff in May, 1853, was rejected by the Porte; the Russians occupied the Danubian principalities; and war was declared by the Porte in October, 1853, by France and England in 1854, and by Sardinia in 1855. A French and English fleet entered the Baltic and captured Bomarsund and one of the Aland Islands, and in the south the allies landed at Varna, under Lord Raglan and Marshal St. Arnaud as commanders-in-chief. While the allies were making preparations Prussia and Austria demanded the evacuation of the Danubian principalities, and on evacuation being ordered by Nicholas, "for strategic reasons," the principalities were provisionally occupied by the Austrians. It soon became obvious that the Crimea must be the seat of the war, and 50,000 French and English troops with 6000 Turks were landed at Eupatoria (Sept. 1854). Five days later the



battle of Alma was won by the allies (20th Sept.), and the march continued toward the south side of Sebastopol. Soon after St. Arnaud died and was succeeded by Canrobert. The siege of Sebastopol was commenced by a grand attack which proved a failure, and the Russians under Liprandi retaliated by attacking the English at Balaklava (Oct. 25), but were defeated with heavy loss. It was at this battle that the famous, but useless, charge was made by the Light Brigade. A second attack at Inkerman was again repulsed by the allies, but the siege works made slow progress during the winter, in which the ill-supplied troops suffered great privations. The death of Nicholas and succession of Alexander II., in March, 1855, brought no change of policy. Canrobert resigned in favor of Pélissier; and shortly after an unsuccessful attack on those parts of the fortification known as the Malakhoff and Redan Lord Raglan died, and was succeeded by Simpson. The bombardment was continued, and in September the French successfully stormed the Malakhoff, the simultaneous attack on the Redan by the British proving a failure. The Russians, however, then withdrew from the city to the north forts and the allies took possession. The chief subsequent event was the capture of Kars, in Asia, by the Russians after a splendid defense by the Turks under General Williams. By this time, however, the allies had practical possession of the Crimea, and overtures of peace were gladly accepted. A treaty was accordingly concluded at Paris on 27th April, 1856, by which the independence of the Ottoman Empire was guaranteed. See Paris, Treaty of.

**CRIMINAL LAW**, the law relating to crimes. The general theory of the common law is, that all wrongs are divisible into two species: first, civil or private wrongs or torts; secondly, criminal or public wrongs. The former are to be redressed by private suits or remedies instituted by the parties injured. The latter are redressed by the state acting in its sovereign capacity. The general description of the private wrongs is, that they comprehend those injuries which affect the rights and property of the individual, and terminate there; that of public wrongs or offenses being, that they comprehend such acts as injure, not merely individuals, but the community at large, by endangering the peace, the comfort, the good order, the policy, and even the existence of society. In the first, therefore, so far as the law is concerned, the compensation of the individual, whose rights have been infringed is held to be a sufficient atonement; but in the second class of offenses it is demanded that the offender make satisfaction to the community as acting prejudicially to its welfare. The exact boundaries between these classes are not, however, always easy to be discerned, even in theory; for there are few private wrongs which do not exert an influence beyond the individual whom they directly injure. The divisions, torts and crimes, are thus not necessarily mutually exclusive, cases sometimes occurring in which the person injured obtains dam-

ages, while at the same time the criminal is subjected to punishment, not as against the individual, but as against the state. It is, moreover, obvious that legal criminality is not in any strict sense the measure of the morality of actions, though the legal enactment tends to enforce itself as a moral law. In large part it is only an approximate expression of the current sense of justice, this expression being both aided and hindered by the historical and constantly reflexive character of legal method. The basis of the criminal law of Britain and the United States is to be found in a series of loose definitions and descriptions, of which many, and those among the more important, date from the 13th century. The irregular superstructure reared upon these consists mainly of parliamentary enactments which originated in the 18th century.

In the United States the common law of England generally obtains, in some states more than in others, while in all there is a criminal code, or a mass of statutes defining crime and fixing the punishment. On the other hand, the United States itself has a criminal code consisting of congressional enactments. The various states have wide differences in their statutory laws with reference to crime.

**CRIMINOLOGY**, the science which deals with crime and its social and individual causes. Criminology in its most rational form, is embodied in the writings of Cesare Lombroso, the Italian alienist, but the attempts of less capable persons, such as professors of sociology, prison chaplains, wardens, "students," and uncultured physicians, have, especially in the United States, reduced the entire discussion to the level of a farce. Intelligently to understand criminology one must first master the main facts of organic evolution, anthropology, and human anatomy.

**CRIMSON**, a rich deep red color, a red that owes its characteristic tint to a certain admixture of blue.

**CRIN'OLINE**, properly a kind of fabric made chiefly of horse-hair, but afterward generally applied to a kind of petticoat supported by steel hoops, and intended to distend or give a certain set to the skirt of a lady's dress. Hooped skirts (farthingales or fardingales), supported by whalebone, were worn in the time of Queen Elizabeth and James I., and the fashion was again introduced in the time of George II. The crinoline proper came in about 1856, and was worn by women of all ranks, sometimes proving by their portentous dimensions a source of much inconvenience and no little danger. The immense bell-shaped crinolines happily fell into disuse about 1866. Crinoline wire was for years a leading branch in the steel trade. A horse-hair and cotton fabric used as a material for making ladies' bonnets is also called crinoline.

**CRIP'PLE CREEK**, a town and county-seat of Teller County, Col., 30 miles west-southwest of Colorado Springs. It was founded in 1890, developed rapidly after 1893, and was nearly destroyed

by fire in 1896. Population, 10,147; the district contains about 50,000.

**CRISIS**, in medicine, the turning-point in a disease at which a decided change for the better or the worse takes place. In regular fevers the crisis takes place on regular days, which are called critical days (the 7th, 14th, and 21st) sometimes, however, a little sooner or later, according to the climate and the constitution of the patient. The word crisis is also figuratively used for a decisive point in any important affair or business, for instance, in politics and commerce. Commercial crises have been in an especial degree the subjects of study at the hands of economists with the result of establishing a curious periodicity in their recurrence.

**CRISP**, Charles Frederic, an American politician and lawyer, born in England in 1845, died 1896. He came to the United States as a child. He fought in the Confederate army and from 1891 to 1895 was speaker of the national house of representatives.

**CRISPI**, Francesco, an Italian statesman born in Sicily in 1819, died in 1901. He was a helper of Garibaldi, and in 1876 he was elected president of the Chamber of Deputies. From that time to 1898 he was prominent in European politics as cabinet officer and prime minister of Italy. In 1898 he retired to the practice of law and occasionally wrote for popular magazines on questions of European policy.

**CRIT'TENDEN**, John Jordan, an American statesman, born in Kentucky in 1787, died in 1863. He served in the war of 1812, was United States senator for 20 years, governor of Kentucky in 1848-50, and twice United States attorney-general. He proposed the Crittenden compromise, which aimed at the permanent retention of slavery in all states in which slavery existed.

**CROA'TIA**, a country which forms with Slavonia and the former "Military Frontiers" a province of the Hungarian portion of the Austrian monarchy, partly bounded by the Adriatic; total area, 16,411 sq. miles. The inhabitants are Croats and Serbs (both Slavs by race), with a mixture of Germans, Hungarians, Jews, and Gypsies. About three-fourths of the population are R. Catholics, the rest belong chiefly to the Greek Church. The chief towns are Agram (the capital), Warasdin, and Karlstadt. Pop. 2,184,414.

**CROCHET** (krō'sha), a species of knitting performed with a small hook, of ivory, steel, or wood, the material used being woolen, cotton, or silk thread. Various fancy articles are made in crochet-work.

**CROCKETT**, David, an American backwoodsman, born in Tennessee in 1786, died in 1836. He was the originator of the aphorism "Be sure you're right, then go ahead." Crockett was the ideal of the American pioneer. He fought in the Indian war under Jackson and was elected to congress and was killed while defending the Alamo.

**CROC'ODILE**, a genus, family, and order of saurian reptiles, comprising the largest living forms of reptiles. The characters of the order Crocodilia are as follows:—The skin is covered with square bony plates; the tail is long and



compressed laterally. The four feet are short, and there are five toes on each of the two fore-feet, and four on each of the two hind-feet, the latter more or less webbed; the limbs are feeble. The jaws are long and their gape of enormous width. The nostrils are at the extremity of the snout, and capable of being closed to prevent ingress of water. The heart is four-chambered. Crocodiles have unequal teeth and no



Crocodile.

abdominal plates, and the cervical and dorsal plates are distinct for the most part. The crocodile of the Nile is the best-known member of the order; another species is met with in South Asia, Sunda, and the Moluccas. The crocodile is formidable from its great size and strength, but on shore its shortness of limb, great length of body, and difficulty of turning enable men and animals readily to escape pursuit. In the water it is active and formidable. It is exclusively carnivorous, and always prefers its food in a state of putrefaction. In Egypt it is no longer found except in the upper or more southern parts, where the heat is greatest and the population least numerous. Crocodiles are still common enough in the river Senegal, the Congo, Niger, etc. They grow sometimes to a length of 30 feet, and apparently live to a vast age.

**CROCUS**, a genus of plants, forming one of the most common ornaments of the garden. They may be divided, according to their period of flowering, into vernal and autumnal. Among the vernal crocuses may be mentioned the white and purple, distinguished by the yellow tube of its flower bearded with hairs, and its sweet scent; the Scotch crocus, with beautiful pencilled sepals, and clear or bluish-white petals. Among the autumnal species are two whose long, reddish-orange, drooping stigmas, when dried, form saffron. See Saffron.

**CRÆSUS**, the last king of Lydia, son of Alyattes, whom he succeeded in 560 B.C., extending the empire from the northern and western coasts of Asia Minor to the Halys on the east and Mount Taurus on the south, including the Greek colonies of the mainland. His riches, obtained chiefly from mines and the gold-dust of the river Pactolus, were greater than those of any king before him, so that his wealth became proverbial.

**CROFTERS**, petty farmers renting a few acres of land, with sometimes the right of grazing their cattle in common on a piece of rough pasture. Crofters are numerous in the Highlands and in the Western Islands of Scotland, as well as in some other localities.

**CROKER**, Richard, an American politician born in Ireland in 1843, emi-

grated to N. Y. City as a child. He began life as a laborer and entered politics as a ward worker. He served as alderman, rose in power in Tammany Hall, and in 1886 became the democratic leader of New York City politics. In 1902 he resigned from Tammany and went to England to live.

**CROLY**, Jane Cunningham, (Jennie June), an American writer, born in England in 1831, emigrated to the United States as a girl. She died in 1901. She was widely known for the part she took in women's reform movements and women's clubs. She was a liberal contributor to newspapers and magazines and published several books for women.

**CROMLECH** (krom'lek), an ancient monument consisting of two or more columns of unhewn stone supporting a large tabular block so as to form a rectangular chamber, beneath the floor



Cromlech at Lanyon, Cornwall.

of which is sometimes found a cist inclosing a skeleton and relics. Sometimes the cromlech was encircled by a ring of standing-stones, as in the case of the standing-stones of Stennis, in Orkney; and sometimes it was itself buried beneath a large mound of earth.

**CROMWELL**, Oliver, Lord-protector of the Commonwealth of England, Scotland, and Ireland, was born at Huntingdon April 25, 1599. The first really authentic fact in his biography is his leaving school at Huntingdon and entering Sidney-Sussex College, Cambridge, April 23, 1616. On the death of his father in 1617 he returned home, and in 1620 married Elizabeth, daughter of Sir James Bourchier. In 1628 he



Oliver Cromwell.

was member of parliament for the borough of Huntingdon, to which he returned on the dissolution in 1629. During the short and long parliaments he represented Cambridge, his influence gradually increasing. At the battle of Winneby (1643) he led the van narrowly escaping death, and in the following year he led the victorious left at Marston Moor, deciding the result of the battle. As the result of the discipline introduced by Cromwell the decisive victory of Naseby was gained in 1645, and Leicester, Taunton, Bridgewater,

Bristol, Devizes, Winchester, and Dartmouth fell into the hands of the parliament. On the occasion of the surrender of Charles by the Scottish army in 1646 Cromwell was one of the commissioners. Though at first supporting parliament in its wish to disband the army, which refused to lay down its arms till the freedom of the nation was established, he afterward saw reason to decide in favor of the latter course. Hastily suppressing the Welsh rising, he marched against the Scottish royalists, whom he defeated with a much inferior force at Preston (Aug. 17, 1648). Then followed the tragedy of the king's execution, Cromwell's name standing third in order in the death-warrant. Affairs in Ireland demanding his presence, he was appointed lord-lieutenant and commander-in-chief; and by making a terrible example of Drogheda (September, 1649), crushed the royalist party in that country within six months. Resigning the command to Ireton, he undertook, at the request of the parliament, a similar expedition against Scotland, where Charles II. had been proclaimed king. With an army greatly reduced by sickness he saved himself from almost inevitable disaster by the splendid victory at Dunbar (Sept. 3, 1650), and a year later put an end to the struggle by his total defeat of the royalists at Worcester (Sept. 3, 1651).

He already exerted a weighty influence in the supreme direction of affairs, being instrumental in restoring the continental relations of England, which had been almost entirely dissolved, and regulating them so as to promote the interests of commerce. The navigation act, from which may be dated the rise of the naval power of England, was framed upon his suggestion, and passed in 1651. The rump parliament, as the remnant of the long parliament was called, had become worse than useless, and on April 20, 1653, Cromwell, with 300 soldiers, dispersed that body. He then summoned a council of state, consisting mainly of his principal officers, which finally chose a parliament of persons selected from the three kingdoms, nicknamed Barebone's Parliament, or the Little Parliament. Fifteen months after a new annual parliament was chosen; but Cromwell soon prevailed on this body, who were totally incapable of governing, to place the charge of the commonwealth in his hands. The chief power now devolving again upon the council of officers (Dec. 12, 1653), they declared Oliver Cromwell sole governor of the commonwealth, under the name of Lord-protector, with an assistant council of twenty-one men. The new protector behaved with dignity and firmness. Despite the innumerable difficulties which beset him from adverse parliaments, insurgent royalists, and mutinous republicans, the early months of his rule established favorable treaties with Holland, Sweden, Portugal, Denmark, and France. In Sept. 1656 he called a new parliament, which undertook the revision of the constitution and offered Cromwell the title of king. On his refusal he was again installed as Lord-protector. but with his powers



now legally defined. Early in the following year, however, he peremptorily dissolved the house, which had rejected the authority of the second chamber. Abroad his influence still increased, reaching its full height after the victory of Dunkirk in June, 1658. But his masterly administration was not effected without severe strain, and upon the death of his favorite daughter, Elizabeth Claypole, in the beginning of August, 1658, his health began to fail him. Toward the end of the month he was confined to his room from a tertian fever, and on Sept. 3, 1658, died at Whitehall, in the sixtieth year of his age. He was buried in King Henry VII.'s Chapel, in Westminster Abbey, but after the restoration his body was taken up and hanged at Tyburn, the head being fixed on a pole at Westminster Abbey, and the rest of the remains buried under the gallows.—Great as a general, Cromwell was still greater as a civil ruler.

**CRONSTADT** (kron'stát), a town of Austria, in Transylvania, after Hermannstadt the principal seat of the industry and trade of the province, lying in a mountainous but well-wooded and romantic district near its southeast corner. Pop. 34,511.

**CRONSTADT**, a maritime fortress of Russia, about 20 miles w. St. Petersburg, both by its position and the strength of its fortifications, the bulwark of the capital, and being also the most important naval station of the empire. Cronstadt used to be the commercial port of St. Petersburg, but since the construction of a canal giving large vessels direct access to the capital it has lost this position. Pop. 48,276.

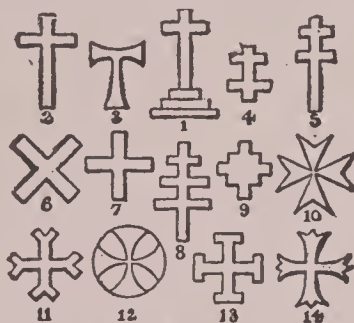
**CROOKES**, Sir William, a noted British chemist and physicist, born in London in 1832. He was one of the earliest physicists to study radio-activity, and invented the term "radiant matter." He did most valuable work in spectroscopy, in the chemistry of dyes, and devised the Crookes tubes which led to the discovery of the X-ray. His radiometer, a little instrument which is moved by light-rays, is familiar to almost everyone who has looked into the show-window of an optician.

**CROQUET** (krō'ka), an open-air game played with balls, mallets, hoops, and pegs on a level area, which should be at least 30 yards long by 20 wide. The iron hoops (shaped like the letter U) are fixed with their two ends in the ground, arranged in a somewhat zigzag manner over the ground; they are usually ten in number. The posts or pegs (two in number) are placed at the near and far end of the field respectively, marking the starting and turning points. The game may be played by any number of persons up to eight, either individually, or arranged in couples or in sides. The object of the players is to drive with the mallets the balls belonging to their own side through the hoops and against the posts in a certain order, and to prevent the balls of their opponents from completing the journey before their own by playing them against those of the enemy, and driving them as far as possible from the hoop or post to be played for; the player or players whose

balls first complete the course claiming the victory.

**CROSBY**, Frances Jane, an American writer of hymns, born in New York in 1820. She became blind when a child, a fact which probably influenced her religious emotionality. Among her well known hymns are "Safe in the Arms of Jesus," and "Pass Me Not O Gentle Savior."

**CROSS**, one straight body laid at any angle across another, or a symbol of similar shape. Among the ancients a piece of wood fastened across a tree or upright post formed a cross, on which were executed criminals of the worst class. It had, therefore, a place analogous to that of the modern gallows as an instrument of infamous punishment until it



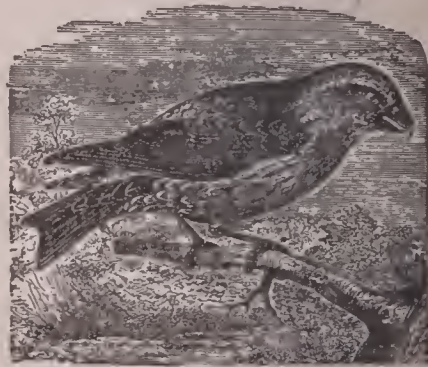
1, Cross of Calvary, a cross on three steps. 2, Latin Cross, a cross the transverse beam of which is placed at one-third the distance from the top of the perpendicular portion, supposed to be the form of cross on which Christ suffered. 3, Tau Cross, (so called from being formed like the Greek letter tau, or cross of St. Anthony, one of the most ancient forms of the cross. 4, Cross of Lorraine. 5, Patriarchal Cross. 6, St. Andrew's Cross, the form of cross on which St. Andrew, the national saint of Scotland, is said to have suffered. 7, Greek Cross, or cross of St. George, the national saint of England, the red cross which appears on British flags. 8, Papal Cross. 9, Cross nowy quadrat, that is, having a square expansion in the center. 10, Maltese Cross, formed of four arrow-heads meeting at the points; the badge of the Knights of Malta. 11, Cross fourchée or forked. 12, Cross pattée or formée. 13, Cross potent or Jerusalem Cross. 14, Cross fleury, from the fleur de lis at its ends.

acquired honor from the crucifixion of Christ. The custom of making the sign of the cross in memory of Christ may be traced to the 3d century. Constantine had crosses erected in public places, palaces, and churches, and adopted it, according to a legend, as the device for a banner in consequence of a dream representing it as the symbol of victory. In his time also Christians painted it at the entrance of their houses as a sign of their faith, and subsequently the churches were for the most part built in the form of a cross. It did not, however, become an object of adoration until after the alleged discovery of the true cross by the Empress Helena (A.D. 326). Its adoption as the Christian symbol may be held to connect itself with the fact that it was used emblematically long before the Christian era, in the same way that traces of belief in a trinity, in a war in heaven, in a paradise, a flood, a Babel, an immaculate conception, and remission by the shedding of blood, are to be found diffused amongst widely sundered peoples. The general meaning attached to the sign appears to have been that of life and regeneration. Since its adoption by Christianity it has undergone many

modifications of shape, and has been employed in a variety of ways for ornaments, badges, heraldic bearings, etc. After the introduction of the cross into the military ensigns of the crusaders its use in heraldry became frequent, and its form was varied more than that of any other heraldic ordinary, some of the varieties being of great beauty. The name cross is also given to various architectural structures, of which a cross in stone was a prominent feature; thus we have market crosses, peaching crosses, monumental crosses, etc.

**CROSS**, Exaltation of the, a Catholic festival celebrated on the 14th of September in honor of the recovery of a portion of the true cross from the Persians by Heraclius (628 A.D.) and its erection on Mount Calvary.

**CROSS**, Victoria. See Victoria Cross.  
**CROSSBILL**, a genus of birds of the finch family, deriving their name from a peculiarity of their bill, the mandibles of which are curved at the tips, so as to



American crossbill.

cross each other, sometimes on the one side and sometimes on the other. The form of the bill enables them to extract with ease the seeds of the pine, their usual food, from underneath the scales of the cones. They build and also breed at all seasons of the year, in December, as in March, April, or May.

**CROSS-BILL**, a bill brought by a defendant against he complainant in an action at law. It is used in equity or chancery cases, and its purpose is to bring the details of the case more fully before the court.

**CROSS-BOW**, or **ARBALIST**, formerly a very common weapon for shooting, consisting of a bow fastened athwart a stock. The bow, which was often of steel, was usually bent by a lever windlass, or other mechanical contrivance, the missile usually consisting of a square-headed bolt or quarrel, but occasionally of short arrows, stones, and leaden bullets. Though largely used on the European continent the cross-bow was superseded at an early period in England by the more efficient long-bow, from which twelve arrows could be despatched per minute to three bolts of the cross-bow.

**CROSS-BREEDING**, the breeding together of animals of different races or stocks. See Breeding.

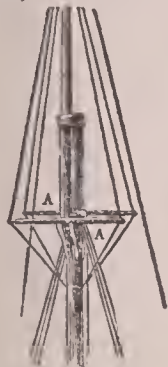
**CROSS-EXAMINATION**, a term applied to the examination given a witness by one party to a suit after the other party has finished the direct examination. Cross examination always assumes previous examination. There



is re-cross examination (when re-direct examination has been taken up after cross-examination) and cross-examination "in rebuttal"—to re-direct examination. Cross examination must be limited to matters touched upon by direct examination. Its purpose is to weaken the value of the witness's testimony.

**CROSS-FERTILIZATION**, in botany, the fertilization of the ovule of one flower by the pollen of another, usually effected by the agency of insects, the action of the wind, water, etc. See Botany.

**CROSS-TREES**, in ships, certain pieces of timber at the upper ends of the lower and top masts, athwart which they are



A A, Cross-trees.

laid, to sustain the frame of the tops in the one, and extend the top-gallant shrouds on the other.

**CRO'TON**, a genus of herbaceous plants, shrubs, and trees, order Euphorbiaceæ, comprehending a great number of species, many of which possess important medical properties. See Croton Oil.

**CROTON-OIL**, a vegetable oil expressed from the seeds of the Croton. It is so strongly purgative that one drop is a full dose, and half a drop will sometimes produce a powerful effect, and it should never be used except by the direction of an experienced physician. When applied externally it causes irritation and suppuration, and thus it is used as a counter-irritant in neuralgia, etc.

**CROUCH**, Frederick Nicholls, an American musician born in London in 1808, died in Maine in 1896. His principal works were Kathleen Mavourneen, The Soldier's Grave, The Emigrant's Lament, Friendship, and Twenty Years Ago.

**CROUP** (kröp). Two diseases are commonly confounded under the term "croup," one a simple and, if promptly treated, a readily subdued disease, the other most fatal. The former is simple inflammation of the inner lining membrane of the larynx—the box of the windpipe—or of the windpipe itself, or of both. It is common in children, and as the air-passage of children is narrow, the swelling produced by the inflammation so diminishes the fair-way that difficult breathing, hoarseness of voice, and a cough like a muffled bark are quickly produced, while the breathing sounds loud and harsh. The other disease is diphtheria of the larynx or windpipe, or both, in which a false membrane is formed which lines the air-passages, and so narrows them. Croup

frequently proves fatal by suffocation, induced either by spasm affecting the glottis, or by a quantity of matter blocking up the air-passages. The earliest symptoms should be noted, and the treatment in the absence of immediate medical advice should consist in the application of hot poultices to the upper part of the chest, while at the same time the child is made to inhale the steam from hot water. Hot drinks are beneficial, and the bowels should be freely opened.

**CROW**, a genus of birds, type of the family Corvidæ. It includes, as British species, the carrion-crow, the hooded or Royston crow, the raven, the rook, and the jackdaw, the last three of which are described under their respective heads. The carrion-crow, or simply the crow, is 18 or 19 inches in length, and about 36 between the tips of the wings. Its plumage is compact and glossy blue-black with some greenish reflections. Its favorite food is carrion of all kinds; but it also preys upon small quadrupeds, young birds, frogs, lizards, etc., and is a confirmed robber of the nests of game birds and poultry. It is not gregarious, being generally met with either solitary or in pairs. It builds a large isolated nest, with from four to six eggs, generally of a bluish-green with blotches of brown. The carrion-crow is easily tamed, and may be taught to articulate words. The American crow is similar to the foregoing, but is smaller and less robust, and is somewhat gregarious. This crow is common in all parts of the U. States, and is deemed a great nuisance by farmers from preying on their corn. The fish-crow, another American crow, resembling the preceding but smaller, is abundant in the coast districts of the southern states. Its favorite food is fish, but it also eats all kinds of garbage, mollusca, etc. In winter its food is chiefly fruit, and it is then fat and considered good eating.

**CROW-BLACKBIRD**, the name of certain American birds. The great crow-blackbird, found in the southern states, Mexico, and the West Indies, is 16 inches long, and of a glossy black plumage. The female is of a light-brown above and whitish beneath. The purple grackle, lesser or common crow-blackbird, is similar in color to the preceding, but smaller. They reach the middle states of America from the south in flocks in the latter part of March, and build in April in the tall pines or cedars. On their first arrival they feed upon insects, but afterward commit great ravages upon the young corn. In November they fly southward again.

**CROWN**, a circular ornament for the head. As now used the name is limited to the head-dress worn by royal personages as a badge of sovereignty, but it was formerly used to include the wreaths or garlands worn by the ancients upon special occasions. Thus, among the Greeks and Romans, crowns made of grass, flowers, twigs of laurels, oak, olive, parsley, etc., and latterly of gold, were made use of as honors in atheletic contests, as rewards for military valor, and at feasts, funerals, etc. It is, however, with the eastern diadem rather than with the classic corona that the

crown as a symbol of royalty is connected; indeed, it was only introduced as such a symbol by Alexander the Great, who followed the Persian usage. Antony wore a crown in Egypt, and the Roman emperors also wore crowns of various forms, from the plain golden fillet to the radiated or rayed crown. In modern states they were also of various forms until heralds devised a regular series to mark the grades of rank from the imperial crown to the baron's coronet. The English crown



1, Crown of England. 2, Russian Crown. 3, French Crown. 4, Austrian Crown. 5, Imperial Crown (Charlemagne's).

has been gradually built up from the plain circlet with four trefoil heads worn by William the Conqueror. This form was elaborated and jeweled, and finally arched in with jeweled bands surmounted by the cross and scepter. As at present existing the crown of England is a gold circle, adorned with pearls and precious stones, having alternately four Maltese crosses and four fleurs-de-lis. From the top of the crosses rise imperial arches, closing under a mound and cross. The whole covers a crimson velvet cap with an ermine border. The crown of Charlemagne, which is preserved in the imperial treasury of Vienna, is composed of eight plates of gold, four large and four small, connected by hinges. The large plates are studded with precious stones, the front one being surmounted with a cross; the smaller ones, placed alternately with these, are ornamented with enamels representing Solomon, David, Hezekiah, and Isaiah, and Christ seated between two flaming seraphim. The Austrian crown is a sort of cleft tiara, having in the middle a semi-circle of gold supporting a mound and cross; the tiara rests on a circle with pendants like those of a miter. The royal crown of France is a circle ornamented with eight fleurs-de-lis, from which rise as many quarter-circles closing under a double fleur-de-lis. The triple crown of the popes is more commonly called tiara.

**CROWN**, a British silver coin value five shillings (\$1.20), first coined by Henry VIII. None were coined from 1851 to 1887. In 1847 and 1848 some pattern crowns were struck with a gold center, but the experiment was carried no further.

**CROWNINSHIELD**, Arthur Schuyler, an American naval officer, born in 1843 and educated at the naval academy. He took part in the naval battles of the civil war, and during the Spanish war was a member of the Board of Naval



Strategy which sat at Washington, D. C. He died in 1809.

**CROWN LANDS**, the lands belonging to the British crown. These are now surrendered to the country at the beginning of every sovereign's reign in return for an allowance (the civil list) fixed at a certain amount for the reign by parliament. They are placed under commissioners, and the revenue derived from them becomes part of the consolidated fund.

**CROWN SOLICITOR**, in England, the solicitor to the treasury, who instructs counsel in all state prosecutions. In Ireland, an officer attached to each circuit, paid by a salary, whose duty it is to take charge of every case for the crown in criminal cases.

**CROYDON**, a mun., parl., and co., borough, England, in county Surrey, 10 miles s. of London, of which it is practically a suburb, near the sources of the Wandle, and near the Banstead Downs. Of special interest are the remains of the ancient palace, long a residence of the Archbishops of Canterbury. Pop. 133,885.

**CROZIER**. See Crosier.

**CRUCIBLE**, a vessel employed to hold substances which are to be submitted to a high temperature without collecting the volatile products of the action. It is usually of a conical, circular, or triangular shape, closed at the bottom and open at the top, and is made of various materials, such as fire-clay, platinum, a mixture of fire-clay and plumbago, porcelain, etc.

**CRUCIFIX**, a cross bearing the figure of Christ. As a rule the figures on the most ancient crucifixes were not carved, but were engraved on gold, silver, or iron crosses. At a later period they were painted on wood, and it is only in the 9th century in the pontificate of Leo III., that the figure of Christ appears carved upon the cross in bas-relief. Originally the body was represented clothed in a tunic reaching to the feet; afterward the clothing was removed with the exception of a cloth round the loins. Until the 11th century Christ is represented alive; since that period he has been represented as dead. In the earlier crucifixes, also, the number of nails by which Christ is fixed to the cross is four, one through each hand and each foot, while in the more modern ones one foot is laid above the other and a single nail driven through both. Many crucifixes bear also the superscription in an abbreviated form, and accessory symbols and figures.

**CRUCIFIXION**, a mode of inflicting capital punishment, by affixing criminals to a wooden cross, formerly widely practiced, but now chiefly confined to the Mohammedans. Different kinds of crosses were employed, especially that consisting of two beams at right angles, and the St. Andrew's cross.

**CRUDEN**, Alexander, compiler of the Concordance to the Scriptures, was born at Aberdeen in 1701. He took the degree of M. A., at Marischal College, and in 1722 proceeded to London. His great work appeared in 1737, under the title of A Complete Concordance of the

Holy Scriptures of the Old and New Testament. He died in Islington in 1770.

**CRUELTY TO ANIMALS**, in the modern sense the wanton maltreatment of beasts. Until recent times the sentiment against cruelty to animals did not take definite form until 1826, when the first society of prevention was organized in England. The first apostle of prevention in the U. States was Henry Bergh, through whose efforts almost all states have been led to adopt laws severely punishing cruelty to animals.

**CRUELTY TO CHILDREN**, the modern notion that it is a crime to mistreat one's own children. In 1875 the New York Society for the Prevention of Cruelty to Children was organized and has been widely copied in other cities. These societies do not concern themselves with child labor, which is cruelty to children on a social scale and one of the greatest crimes of which society is guilty.

**CRUIKSHANK**, George, the greatest of English pictorial satirists after Hogarth, born in London 1792, of Scottish extraction. The earliest of his drawings known is dated 1799, when he was only seven years of age, and when fifteen he was comparatively distinguished. In 1837 he commenced in Bentley's Miscellany his famous series of etchings on steel illustrative of Dickens' *Oliver Twist*, followed two years later by those for Ainsworth's *Jack Sheppard*, and then by those for Windsor Castle and the Tower of London. Having connected himself with the temperance movement he produced the *Bottle*, a powerful and popular series of designs, but marking clearly the limits of his art. His temperance connection and his absurd claims to having suggested the idea of Dicken's *Oliver Twist*, undermined his artistic reputation. Poorly paid for work by which others profited, he was latterly obliged to part with the vast collection of his works, and in 1866 \$250.00 a year was settled on him from the Royal Academy's Turner Annuities. He latterly turned his attention to oil-painting, his most noteworthy pictures being *Tam o' Shanter*, *Disturbing a Congregation*, and *The Worship of Bacchus*. He died in 1878.

**CRUSADES**, the wars carried on by the Christian nations of the West, from the end of the 11th till the latter half of the 13th century, for the conquest of Palestine. They were called Crusades, because the warriors wore the sign of the cross. The antagonism between the Christian and Mohammedan nations had been intensified by the possession of the Holy Land by the Turks and by their treatment of pilgrims to Jerusalem; and the first strenuous appeal was assured of response alike from the pious, the adventurous, and the greedy. The immediate cause of the first crusade was the preaching of Peter of Amiens, or Peter the Hermit, who in 1093 had joined other pilgrims on a journey to Jerusalem. A well-conducted regular army of 80,000 men was headed by Godfrey of Bouillon; Hugh of Vermandois, brother to Philip, king of France; Baldwin, brother of Godfrey; Robert

II. of Flanders; Robert II. of Normandy, brother of William II., king of England; Raymond of Toulouse; and other heroes. After remaining nearly a year in the neighborhood of Antioch they commenced, in May, 1099, their march against Jerusalem, the siege of which they commenced in June. Their numbers were now reduced to little more than 20,000 men; but after a fierce struggle the town was taken by storm on July 15, and Godfrey of Bouillon was chosen king of Jerusalem, or, as he preferred to term himself, Protector of the Holy Sepulcher. At his death in 1100 he was succeeded by his brother Baldwin, who had in the early part of the crusade established himself in Edessa, and made himself ruler of an extensive territory stretching over the Armenian mountains and the plain of Mesopotamia.

The second great and regularly-conducted crusade was occasioned by the loss of Edessa, which the Saracens conquered in Dec., 1144. Fearing still graver losses, Pope Eugenius III., seconded by Bernard of Clairvaux, exhorted the German emperor Conrad III., and the King of France, Louis VII., to defend the cross. Both these monarchs obeyed, and in 1147 led large forces to the East, but returned without accomplishing anything in 1149.

The third crusade was undertaken after the capture of Jerusalem by Saladin in 1187, the monarchs Frederick I. (Barbarossa) of Germany, Philip Augustus of France, and Richard I. (Cœur de Lion) of England, leading their armies in person. Richard defeated Saladin and occupied Jaffa or Joppa; but having twice vainly set out with the design of besieging Jerusalem, he concluded (Sept. 2, 1192) a truce of three years and three months with Saladin, who agreed that pilgrims should be free to visit the Holy Sepulcher, and that the whole sea-coast from Tyre to Jaffa (including the important fortress of Acre) should belong to the crusaders.

The fourth crusade was set on foot by Pope Innocent III., who commissioned Fulk of Neuilly to preach it in 1198. Among its chief promoters was Godfrey of Villehardouin, seneschal of Champagne; Baldwin, count of Flanders and Hainaut; Dandolo, the aged doge of Venice; and the Marquis of Montferrat, who was chosen leader. The crusaders assembled at Venice in the spring of 1201, but were diverted from their original purpose first by the capture of the Dalmatian town of Zara, and then by the expedition which ended in the sack of Constantinople and the establishment of a Latin empire there (1204).

The fifth crusade, undertaken by Andreas of Hungary in 1217, and shared in by John of Brienne, to whom the title of King of Jerusalem was given had little other result than the temporary occupation of the Nile delta.

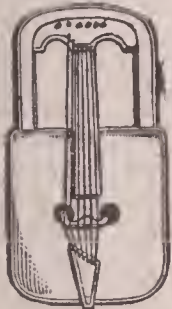
The sixth crusade, that of Frederick II., emperor of Germany, was undertaken at the instance of Popes Honorius III. and Gregory IX. The seventh and eighth Crusades were led by St. Louis of France (Louis IX.) in person.



Despite their want of success, the crusades were of considerable indirect value in that by these joint enterprises the European nations became more connected with each other, the class of citizens increased in influence, partly because the nobility suffered by extravagant contributions to the Crusades, and partly because a more intimate commercial intercourse greatly augmented the wealth of the cities, and a number of arts and sciences, till then unknown in Europe, were introduced.

**CRUSTA'CEA**, one of the primary branches into which is divided the great group of Articulate or Annulose animals. The body is divided into head, thorax, and abdomen, of which the two former are united into a single mass, cephalothorax, covered with a shield or carapace, and the abdomen usually presents the appearance of a tail. In some—the sand-hopper, wood-louse, etc.—the head is partially distinct from the thorax. The Crustacea breathe by branchiæ or gills, or by membranous vesicles, or by the general surface; and the body is composed of a series of rings more or less distinct. They possess the faculty of reproducing lost parts in an eminent degree.

**CRWTH** (kruth), a Welsh name for a kind of violin with six strings, formerly much used in Wales. Four of the



Crwth.

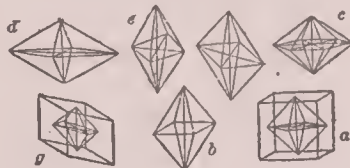
strings were played on by a bow, and two were struck or twitched by the thumb. Its general length was 22 inches, and its thickness  $1\frac{1}{2}$  inch.

**CRYPT**, originally a subterranean cell or cave, especially one constructed for sepulture. From the usage of these by the early Christians crypt came to signify a church underground or the lower story of a cathedral or church. It is usually set apart for monumental purposes, but is sometimes used as a chapel. The crypt is a common feature of cathedrals, being always at the east end, under the chancel or apse. The largest in England is that of Canterbury Cathedral; that of Glasgow Cathedral, formerly used as a separate church, is one of the most perfect pieces of architecture in Britain.

**CRYPTOG'RAPHY**, the art of writing in secret characters or cipher, or with sympathetic ink. The simplest method consists in choosing for every letter of the alphabet some sign, or another letter or group of letters. Thus the letter of Charles I. to the Earl of Glamorgan with respect to the Catholics of Ireland was composed in an alphabet of 24 strokes variously placed about a line. The names in the records of the Clan-na-Gael Society were, according to the Times newspaper, written in a

cipher formed by taking in each case the letter previous to that intended; and the cipher devised by Lord Bacon consisted in an alphabet formed by different arrangements of the letters a and b in groups of five. All these methods, however, are easily deciphered by experts, as also is that employed by the Earl of Argyle in his plot against James II., in which the words of the letter were set down at concerted distances, the intervals being filled up with misleading words. Even the more complex, however, present, as a rule, only temporary difficulty to an expert. The fact that the most frequently recurring letter in the English language is the letter e, that the most common double vowels are ea and ou, that r, s, and t are the most frequent terminal letters, etc., are of no small assistance in forming a key to any given cryptogram.

**CRYSTAL**, in chemistry and mineralogy, any body which, by the mutual attraction of its particles, has assumed the form of some one of the regular



Crystals.

geometric solids, being bounded by a certain number of plane-surfaces. The chemist procures crystals either by fusing the bodies by heat and then allowing them gradually to cool, or by dissolving them in a fluid and then abstracting the fluid by slow evaporation. A crystal consists of three parts. 1st, Plane surfaces, called faces, which are said to be similar when they are equal to one another and similarly situated; dissimilar, when they are unequal or have a different position. 2d, Edges, formed by the meeting of two faces. They are said to be similar when formed by similar faces; dissimilar, by dissimilar faces. Equal edges are formed when the faces are inclined at the same angle to one another; unequal, when they are inclined at different angles. 3d, Solid angles, formed by the meeting of three or more faces; and in this case also there are similar and dissimilar, equal and unequal solid angles, according as they are formed by similar or dissimilar faces, and equal or unequal angled edges. The angles of crystals are measured by an instrument called the goniometer.

**CRYSTAL'LOMANCY**, a mode of divining by means of a transparent body, as a precious stone, crystal globe, etc. The operator first muttered over it certain formulas of prayer, and then gave the crystal (a beryl was preferred) into the hands of a young man or virgin, who received an answer from the spirits within the crystal.

**CUBA**, the largest and most westerly of the West India Islands, lying at the entrance to the Gulf of Mexico, about 150 miles from Florida and Yucatan. Its length is 750 miles; breadth, 20 to over 120; area, 43,220 sq. miles. Since the Spanish-American war of 1898 Cuba has been independent, and is now

under its own republican government. The navigation of the coast is unsafe, on account of rocks and shoals, but there are many excellent and easily-accessible ports and anchoring places. The chief commercial ports and harbors are, on the north, Havana (the capital), Matanzas, Cardenas, Sagua, Remedios; on the south, Santiago, Trinidad, Cienfuegos, and Guantanamo. The surface exhibits various chains or groups of hills extending from west to east, and in the extreme southeast is a mountain range rising to the height of over 8000 feet. At the foot of the hills the country opens into extensive savannahs. A considerable number of small streams water the island on both sides. Cuba is rich in minerals; those worked are chiefly copper and iron. Bitumen is plentiful, both in a liquid form and in a soft resinous state. There are many mineral springs, and on the north coast are extensive lagoons, which in dry years produce immense quantities of marine salt. The climate is hot and dry during greater part of the year, but is, on the whole, more temperate than that of some other islands in the same latitude. Rain often descends in torrents from July to September, but no snow is known to fall on the highest mountains, though frost occurs occasionally. The soil is fertile and the vegetation is exceedingly luxuriant. Forests of mahogany, ebony, cedar, fustic, and other useful woods, abound; and the fields are covered with flowers and odoriferous plants. The principal cereal cultivated is the indigenous maize, or Indian corn. Rice is also produced in many districts; but the principal crops are sugar and tobacco, with a little cotton, cocoa, coffee, indigo, etc. The best tobacco is grown in the district of Vuelta Abajo, near Havana. A considerable extent of country is appropriated also to cattle-breeding farms, and to farms on which fruit and vegetables are raised. The principal fruits are the pine-apple, oranges, shaddocks, plantains, bananas, melons, lemons, and sweet limes; figs and strawberries are also to be had. The most valuable domestic animals are the ox, horse, and pig, which form a large proportion of the wealth of the island; the sheep, goat, and mule are inferior in quality and numbers. Among the few indigenous mammals are two species of aguti and an opossum. The sylvan birds are numerous and in great variety; but birds of prey are few, and snakes and reptiles are not very numerous. The shores abound with turtle, and in the deep gulfs and bays the alligator is found. The manati is met with in the deep pools of fresh water, and the iguana is not uncommon. The manufactures are confined to the making of sugar, rum, molasses, and cigars, and these, with tobacco, form the chief exports. Next in commercial importance rank mahogany and other valuable timber and fruit. The chief imports are grain and flour, salted provisions, brandy, wines, hardware, and cotton, linen, and woolen manufactures. The great bulk of the trade is with the U. States. There is also a considerable trade between Cuba and Great Britain. The legal system of money, weights, and



measures of Cuba are the same as those of Spain. The internal traffic of the island has been greatly facilitated by road improvements and by railways, the length of which in operation now amounts to about 1000 miles. Steam-vessels ply between Havana and other parts of the coast. Under Spain Cuba was governed by a captain-general. Cuba was first discovered on October 28, 1492, by Columbus, who revisited it in 1494, and again in 1502. In 1511 the Spaniards formed the first settlement on the island, and the native inhabitants were soon extirpated. Negro slaves were introduced in 1524. Attempts to put an end to slavery were made in 1820 and 1845 without result; but in 1868 a law, designed gradually to put an end to slavery, was passed. In that year commenced an insurrectionary struggle against the mother country, which lasted for ten years. The final abolition of slavery dates only from 1886. In 1895 began another insurrection, which continued till the war with the U. States. The pop. is 1,772,797, of whom over 500,000 are colored. During 1906 an insurrection took place against the Palma government which necessitated, on the appeal of the Cubans, the placing of an American military governor with forces on the island pending the settlement of the troubles. Early in 1907 there were threats of insurrection against the United States.

**CUBATURE OF A SOLID**, the finding of the solid or cubic contents of it.

**CUBE**, in geometry, a regular solid body with six equal square sides. The solid content of any cube is found by multiplying the superficial area of one of the sides by the height; or, what comes to the same thing, by multiplying the number that expresses the length of one of the edges by itself, and the product thus found by that number again. Cubes are to one another in the triplicate ratio of their diagonals.—Cube, or cubic number, in arithmetic, that which is produced by the multiplication of a square number by its root; thus 64 is a cube number, and arises by multiplying 16, the square of 4, by the root 4.

**CUBE ROOT**, the number or quantity which, multiplied into itself and then into the product, produces the cube; or which, twice multiplied into itself, produces the number of which it is the root: as 2 is the cube root of 8, because twice 2 are 4, and twice 4 are 8.

**CUBIC FOOT** of any substance, so much of it as is contained in a cube whose side is 1 foot.

**CUBIT**, in the mensuration of the ancients, a long measure, equal to the length of a man's arm from the elbow to the tip of the fingers, or, say equal to 18 inches.

**CUCK'OO**, a scansorial or climbing bird. The note from which it derives its name is a love-call used only in the mating season. The greater number of species belonging to the genus are confined to hot countries, more especially India and Africa, though some are summer visitants of colder climates. In America no true cuckoos are found, the genus to which the so-called American cuckoo belongs, differing very essentially from them in its habits.

**CU'CUMBER**, the fruit of the plant belonging to the Cucurbitaceæ or gourd order, and supposed to have been originally imported into Europe from the Levant. Though grown in England in the 14th century, it did not become generally used until after the reign of Henry VIII. It is an annual with rough trailing stems, large angular leaves, and yellow male and female flowers set in the axils of the leaf-stocks. Other species of the cucumber genus are the common melon, and the water melon.

**CUCUMBER-TREE**, a fine American forest tree, so named from the appearance of its fruit.



The cuckoo.

**CUD'DAPAH**, or **KADAPA**, a district and town, Hindustan, presidency Madras. The district area is 8745 sq. miles. The forests contain much valuable timber, and the minerals include iron ore, lead, copper, diamonds, etc. Pop. 1,272,072.—The town lies on a small river of same name, an affluent of the Pennar, 140 miles n.w. Madras. It exports indigo and cotton. Pop. 17,387.

**CUIRASS** (kwi-ras'), an article of defensive armor, protecting the body both before and behind, and composed of

of Charles II., and in France a little later. It was reintroduced by Napoleon I., and the achievements of his cuirassiers led to its adoption for regiments of heavy cavalry in most European armies.

**CULLO'DEN MOOR**, a heath in Scotland, 4 miles e. of Inverness, celebrated for the victory obtained April 27, 1746, by the Duke of Cumberland over Prince Charles Edward Stuart (the Pretender) and his adherents. The battle was the last fought on British soil, and the termination of the attempts of the Stuart family to recover the throne of England.

**CULLOM**, Shelby Moore, an American senator, born in Kentucky in 1829, removed to Illinois in 1855 as a lawyer. He served in the state legislature and was twice speaker of the house (1861 and 1873), was a member of congress for three terms, governor of Illinois from 1876 to 1883, and since then has been United States senator. He is one of the leaders of the republican party in Illinois.

**CULMINATION**, in astronomy, the passing of a star through the meridian, because it has at that moment reached the highest point of its apparent path in the sky.

**CUM'BERLAND**, the extreme north-western county of England. Length, north to south, 75 miles; extreme breadth, 45 miles; area, 970,161 acres, rather more than a half of which is under cultivation. There is great variety of surface in different parts. The two largest rivers are the Eden and the Derwent. The county embraces part of the "lake country" of England. The largest lakes are Derwentwater, Bassenthwaite, Loweswater, Crummock, Buttermere, Ennerdale, Wastwater, Thirlmere, and part of Ullswater. Cumberland is rich in minerals, including lead, gypsum, zinc, and especially coal and rich hematite iron-ore. In the western division of the county there are a great many blast-furnaces, and works for the manufacture of steel and finished iron. The



Culloden moor.

leather, metal, or other materials variously worked. It was in common use throughout Europe in the 14th century. In England it fell into disuse in the time principal crops raised are oats, barley, wheat, and turnips, but the bulk of the inclosed lands is sown in clover and grass. Population 270,000









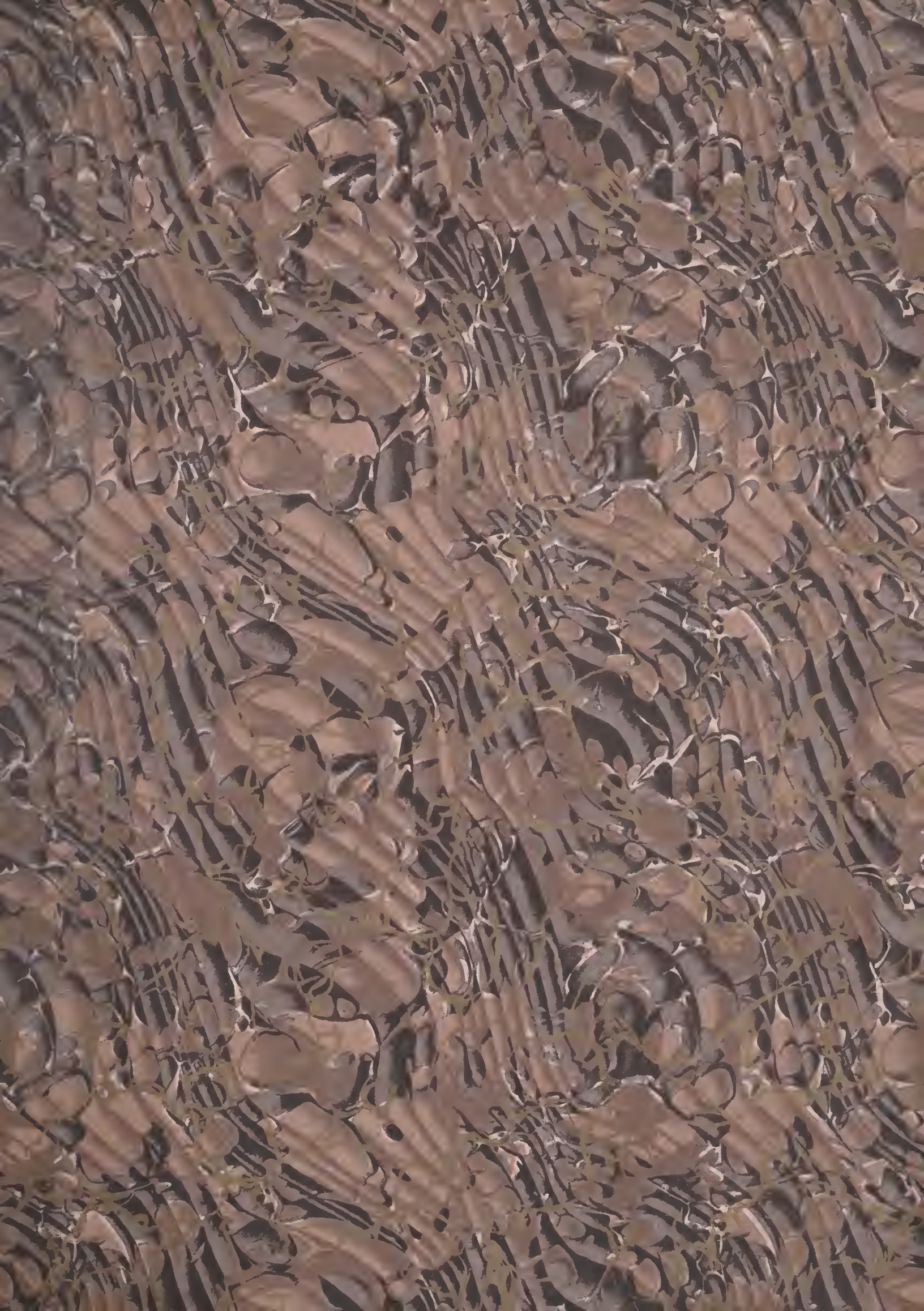














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